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Engineering Guidance In New York City High Schools

By W. H. Larkin

Chairman Publications Committee, National Society of Professional Engineers. This is a report covering the activities of the New York Engineering Committee, on Student Guidance

The New York Engineers' Committee on Student Guidance, hereafter referred to as the Committee, was formed early in 1937 for the purpose of providing specific guidance for those high school students in the Metropolitan area who are considering engineering as a career. For the young man non-biased information about engineering is important at high school age. He has ahead of him ten to fifteen years of hard work—at least four years in an engineering school and six to twelve years of training as a cadet engineer in industry.

From the educators' point of view the sixty percent mortality between entrance as freshmen and graduation as seniors represents a tremendous nonproductive burden on engineering school facilities. This high mortality rate is due primarily to a faulty weeding out process at high school level. This Committee feels that through their efforts a more comprehensive weeding out process can be encouraged before graduation from high school.

General Objectives

The objectives of this Committee can be simply stated as follows: To present to the high school student a straightforward, ungarnished picture of the aptitudes and preparation necessary for embarkation upon a professional engineer's career; to point out that this career takes ten or more years of earnest preparation, that the capacity to pay for the formal education necessary must be accompanied by the ability to learn and that an outstanding ability to learn can often find ways of paying; to dissuade the obviously unfit and yet give a true picture of the road ahead to the fit; and to help the student decide whether he has those natural aptitudes for at least reasonable success in the profession.

The problem presented to this Committee had many features peculiar to this area. The Metropolitan sections of the technical societies represented on the Committee cover the large industrial and urban areas of Northern New Jersey, Westchester County, parts of Connecticut, all of Long Island and Greater New York City. With the knowledge that the Committee would eventually be called upon to cover all the territory mentioned it decided to make its start in New York City. The war has since prevented the expansion of its activity beyond New York City, through its inability to expand its personnel suitably.

W. H. Larkin

Difficult Problems

New York City in itself presented problems capable of occupying the entire attention of the Committee as originally made up. For example, there are approximately fifty high schools of academic grade in the city with enrollments ranging from two thousand to ten thousand each. These schools are located in five boroughs and one school such as Tottenville High School in Richmond may be as much as thirty-five to forty miles from its farthest neighbor, let us say the DeWitt Clinton High School in the Bronx. The problem is further complicated by a number of Parochial High Schools also distributed throughout the five boroughs.

During the eight years of the Committee's existence, it has been asked to participate in four general types of meetings—namely, "Career Day", Parent Teachers' Association meetings, the special series of meetings held for Brooklyn Technical High School, and the average or regular meeting held at the majority of high schools. At the "Career Day" meeting, engineering is one of about twenty-five vocations represented. The meeting usually starts with a general assembly which is addressed by a vocational specialist.

Following the general assembly the students are re-assembled in specific class rooms according to their vocational interests and each group is then addressed by the representative from the vocation of its choice. The amount of time allowed for close contact with the student is very limited and the Committee feels that such a meeting does not offer to the student the opportunity he or she should have to quiz the Committee. As a rule, the Committee discourages participation in meetings of this sort but in the case of three or four schools has participated when requested.

Parents Participate

Once in a while the Committee is asked to appear before a Parent Teachers' Association meeting at which students and parents are present. Following the formal PTA business meeting, the entire program is turned over to the Committee, which then presents its regular program in the normal way. Based on the experience which the Committee has had at such meetings it feels that the parents tend to dominate the question period and that the students have little opportunity to ask questions about engineering or the preparation necessary. Compared to the close contact which is made with the student at the average meeting, the amount of student contact made at the PTA meeting is negligible. For this reason this Committee prefers its regular meetings rather than a meeting sponsored by a Parent Teachers Association.

Brooklyn Technical High School is a combination terminal high school and college preparatory high school. Admission to it is obtained through competitive examination and students are admitted only as they give promise of being able to benefit from the courses offered. As would be expected,

the majority of the students of this school are interested in engineering and many of them are anxious to attend the meetings held by this Committee. Therefore, during two days in the Spring about five hundred students are given the opportunity to attend the Committee's meetings on Engineering Guidance. During the first day there is a general assembly in the Auditorium and an outstanding engineer from the Metropolitan area addresses the students, usually on engineering as a career. Such speakers have been Dr. Barker of Columbia, Dr. Saville of N.Y.U., and Dean Sackett.

Following the general assembly, on the first day, there will be about three group meetings, as for example, for those interested in mining and metallurgical engineering, chemical engineering and civil engineering. During the second day, there will be an additional three or four group meetings with engineers representing such fields as mechanical engineering, electrical engineering and aeronautical engineering. At each of these meetings the speaker covers the requirements for entrance into the field of engineering and then explains the type of work done by the engineer in his particular field. Approximately forty minutes of the sixty minutes allowed for each meeting are devoted to questions.

Sponsorship of Meetings

The meeting which is held at the average high school is usually sponsored by the Science Club or the Mathematics department and arrangements are completed by a Guidance counsellor. The meeting is held after school hours and those students in attendance are there on their own time, which tends to exclude all but those students with a genuine interest in engineering. This weeding out process is further encouraged by the Guidance Counsellor. Following the twenty minute general talk, five or ten minutes are devoted to questions of a general nature. These questions are usually handled by the chairman of the meeting but they may be referred to one of the other Committee members in attendance.

Following this brief period for general questions the meeting is split into small groups, the number of groups depending upon the number of committee members present. These small groups may be formed according to interest in particular branches of engineering. Thus there may be groups formed for questions in mechanical engineering, electrical engineering, civil engineering or chemical engineering. If a Committee representative for one of these groups is not present, then the students in that particular field will join the remaining groups. The Committee feels that any one of their members is capable of answering ninety percent of the questions which may be asked regarding any branch of engineering.

Attendance Heavy

The average meeting held by the Committee will consist of from ten to two hundred students led by from two to six engineers. The students will be juniors and seniors. The Committee is most anxious that as many juniors attend as possible. It finds cases where students' curricula obviously do not prepare them for the admission to an engineering school. A deficient curriculum usually stems from the students' failure to impress upon the school authorities his desire to apply for admission to an engineering school.

While the Committee in no way interferes in the relationship between the students and his faculty, it impresses upon the student the necessity for determining from the engineering school of his choice, the minimum requirements for admission. If his curriculum does not satisfy these minimum requirements, a junior may have an opportunity to revise his curriculum without loss of time, whereas a senior may be faced with a summer of study or an additional year in high school to rectify an error of omission.

Established Procedure

Based on the Committee's experience to date, the following procedure has been fairly well established for the school conference:

Preliminary Preparation. The program at every school meeting should be the result of careful planning by the chairman of the committee. He should remember that the Engineering Profession is on trial at every meeting, and a haphazard presentation of our program by a leader who has no definite schedule can do the committee and the profession tremendous harm.

The committee should have available for all of its meetings, men who feel at home on their feet before a group, who can present the subject in a clear, concise manner within the time limit set, and who have the ability to handle the question period in rapid fire order. These specifications are not easy to fill, and recognizing this difficulty the committee should undertake a definite program to train a certain number of its members as group leaders.

The general talk should be the result of careful preparation by the speaker. The subject matter must be presented in terms of experiences and things familiar to the audience. The speaker should use in his illustrations objects known to his audience such as airplanes, highways, radio and bridges. He should be specific in his explanation of the work done by the several branches of engineering.

Before groups of high school students the speaker should avoid highly technical language, should present the topic in an orderly manner, and should check his terminal facilities—he must not exceed his allotted twenty minutes. The GENERAL TALK should be arranged somewhat along the following lines:

Engineering as a Career

A. Introduction.

1. Knowledge introduction by Host, representing the High School.
2. Greet the students of — — — High School in behalf of the New York Engineers' Committee on Student Guidance.
3. Introduce other engineers present and explain nature of Committee.

B. Purpose: To help you decide now whether you have those aptitudes necessary for a reasonable success in engineering. Important at this stage in your education because:—

1. Records show only 38 men graduate out of every 100 who enter engineering school.
2. Time required to train for engineering not less than ten years.
3. Selection of a vocation requires careful planning to fit the individual.
4. Avoid these pitfalls:

a. Choosing a fashionable career, regardless of aptitudes.

b. Choosing a career for a quick financial return.

C. Engineering, what it is.

1. Concerned with the creation of services and things for public use such as electricity, automobiles, pure water, radios, rubber and oil.
2. Deals with the five Ms

a. Men—art of management.
b. Materials—mining, plastics, etc.
c. Machines—design and operation.
d. Money—economical use of.

e. Markets—design and location for.

D. Engineering requires a specific combination of natural aptitudes, evident in high school, the most important of which are:—

1. Interest.

a. Necessary to produce best effort and best return.

b. Necessary to derive pleasure from chosen vocation.

2. Personal qualities which must be present or developed.

a. Cooperativeness.

b. Honesty.

c. Industry.

d. Initiative.

e. Courage.

f. Health.

3. Proficiency in the tools of engineering.

a. Mathematics through trigonometry.

b. Science—physics and chemistry.

c. English—spoken and written.

E. The Engineer.

1. His preparation.

a. Graduate of engineering school of recognized standing.

b. Graduate work in school or cadet course in industry.

c. 5-10 years active engineering work.

2. His work is concerned primarily with

a. Design.

b. Production.

c. Operation.

d. Application—sales.

3. He may choose work in a number of major fields such as

a. Mechanical, dealing with machines.

b. Civil, dealing with public works.

c. Electrical, dealing with power or communications.

d. Chemical, dealing with process industries such as production of plastics, rubber, etc.

e. Mining and Metallurgical, concerned with the extraction and refining of minerals and oil.

f. However, in many cases, he may not choose his particular field or branch until several years after graduation from engineering school.

4. The Engineer works with three major groups of persons:

a. The artisans whose manual dexterity and specialized skill are needed to perform the many jobs and operate the many machines of industry.

b. The technicians skilled in the development of detail plans, the maintenance and operation of machines rather than theory, and the supervision of groups of artisans.

c. Cadet engineers in various stages of training being advanced as their capacity to assume responsible charge of work grows.

Conclusions

Conclusions

1. Appeal for serious self-examination.

2. Refer to committee's bibliography.

3. Offer personal interview to limited number of students.

4. Open question period.

An outline such as the above should be placed in the hands of every member of the committee. The chairman of a given meeting should be notified of his selection for that purpose at least a week before the meeting. He should then proceed to outline the talk as he proposes to give it, cover the main headings noted above, and schedule it to require eighteen to twenty minutes. He should speak with his watch on the desk before him and should not forget to check with it periodically. To exceed his share of the time is to shorten the most valuable portion of the meeting, the question period.

* * *

Questions Frequently Asked

The Committee runs into certain questions which are repeated from school to school in one form or another. For example, this question is frequently asked: "Is there racial discrimination in the engineering field?" Discrimination does not exist, but it is against the individual who cannot adapt himself to the exacting requirements of the profession rather than against any particular race or creed. Discrimination is against a personality rather than against a group.

Another question relates to the curriculum of one engineering school as compared to another. The Committee leaves at all high schools it visits the E.C.P.D. list of accredited engineering schools. So far as the Committee is concerned, this list is its yardstick. Either a school is accredited or it is not. However, other factors enter the picture when a particular student is concerned with a choice between schools. The Committee points out certain pertinent factors and leaves this decision to the student or his parents. First, is the course desired accredited at the school being considered? Second, how much is the student able to pay for his education?

If the student must livt at home and can spend only carfare and lunch money, he must obviously attend a school located within easy commuting distance. This may be a school subsidized by the city or state or it may be a school at which, through a competitive examination, a student receives a full tuition scholarship. As the student's capacity to pay increases, his choice of schools widens.

Necessary School Preparation

The Committee is frequently faced with a question of the best type of high school preparation. This is a particularly difficult question, but it appears that an academic high school course which prepares the student fully to meet the entrance requirements of a given engineering school is the best.

High school students seem to be unduly concerned about specialization —for example, many of them express an early desire to be an aeronautical engineer, a diesel engineer or a refrigeration engineer without realizing that these are highly specialized branches of mechanical engineering. The Committee feels that a student should not concern himself with specialization before the second year of his engineering school course and frequently may postpone specialization until some time after graduation.

The question is frequently asked, "What does a particular kind of engineer do?" Such a question is handled by the specialist in that field of engineering. During the group conferences following the general talk, the Committee has found that "Engineering as a Career" is a helpful reference to give the student with such a question. The student frequently inquires about the earnings of an engineer. The Committee bases its answer on normal times and usually gives a very moderate figure as a starting wage. A student who appears to be concerned solely with the earnings of an engineer is, in the Committee's opinion, not genuinely interested in engineering as a career. He is frequently so advised and is offered the suggestion that he belongs in some other field.

The Language Problem

Students frequently inquire about the value of languages. If a student is

(*Continued on page* 19)

The Engineer in Administrative Organization

*By James A. Colvin**

An address delivered before the Senior Engineering Class of the Minnesota Institute of Technology

This is the last of a series of talks arranged by the University Contact Committee of the Minnesota Association of Professional Engineers for presentation to the Senior Engineers regarding professional problems. You have now been advised by a group of well-qualified professional men regarding the general aspects of the engineering profession, the legal and ethical viewpoints, and the importance of registration in its relation to both public and private practice.

My assignment has to do with the place of the Engineer in administrative organization—not only from the standpoint of how he, the engineer, fits into an organization, but also regarding the procedure by which he becomes a part of that administration in his own right. Many of you young men, and a much larger per cent than you realize, will ultimately find yourself in this group of engineers. In discussing this matter I do not claim to express the views of any particular organization as it exists today. Others may agree or disagree with what I have to say. In this respect it represents the results of my own personal experiences, both as a young engineer and later when I had an opportunity to observe other young men who had problems which were somewhat similar to mine. My references will principally concern engineers who become associated with industrial and manufacturing concerns as apart from governmental or public activities, or the practice of engineering as a consulting engineer.

Getting a Job

Let us consider the young engineer who is making his first contact for employment with an industrial or manufacturing concern. For lack of a better term we will call him an "Apprentice Engineer." This young man either having graduated or about to graduate, has made a contact for a position. He may have applied on his own initiative with some concern that he has chosen, or he may have been interviewed by a representative of some large concern who makes it a practice of interviewing prospective employees while they are still undergraduates.

James A. Colvin

Mr. Colvin was born on the South Shore of Lake Superior, in Northern Michigan in 1893. *Moved to Sandstone, Minnesota, in* 1896. *Graduated from High School there in* 1908. *Entered University in* 1911 *and graduated from Mechanical Engineering College in* 1915 *with a degree of Mechanical Engineer. Member of Theta Tau and Tau Beta Pi engineering fraternities.*

Following graduation employed in the stone quarry business near St. Cloud, and in 1917 *entered the employ of the Northern States Power Company. Entered military service as a Private in the Engineer Corps during World War I and later transferred to the Tank Corps. In military service* 19 *months, of which* 7 *months was overseas in France. Discharged as a Captain after serving as Brigade Adjutant of the* 307*th Tank Corps Brigade. Returned to Northern States Power Company in May* 1919 *and in* 1923 *was appointed Superintendent of Generation. Appointed Manager of Power Production & System Operation in* 1941 *which position he now holds.*

Has served as Chairman of the Minneapolis Section of the American Society of Mechanical Engineers and President of The Engineers' Club of Minneapolis. He was President of the Minnesota Federation of Engineering Societies in 1932.

What is this employer looking for in his future employee, and what is the young engineer looking for in considering his prospective employer? Certain things must be definitely remembered by the young engineer; first, his training and education are taken for granted on the basis of the standing of the institution from which he has graduated or is about to graduate. Second, he has available full and complete information with respect to the performance of this particular man all through his years of schooling. In addition to this he may have obtained information about other activities in which this man may have engaged during his undergraduate years at college. As a result of the interview, assuming that the interviewer is skilled in this particular field, he will gain certain impressions regarding the candidate as to his personal appearance, personality, and the ease with which he handles himself in a direct interview.

With this background the selection is made, but the employer is far from satisfied because he must still find out how this particular individual fits himself into an organization—how he adapts himself to other men. In other words, how he gets along in a very broad sense. Much will depend upon what happens in the first year of his organizational contact in the determining of where this man eventually will find his place.

What to Look For in a Job

Now let's interject the other side of the picture. What does the young engineer look for? Generally speaking his first answer will be opportunity to advance. Security of employment may be important in the minds of many men. Working conditions which cover many, many things are a secondary factor, but if they are important in any one individual's mind, then they should be determined beforehand. In other

* Manager, Power Production and System Operation, Northern States Power Company.

words, what I am trying to say to you is that the responsibility for a happy relationship depends not only upon the employer but also upon the applicant, and he should settle these questions before he commits himself. In any event, the prospective employer should be fair and honest, he should outline the policy of the organization with respect to its new employees and if it has no definite policy that should be understood.

Difficulties Getting Started

After these preliminaries have been settled the young engineer finds himself frequently in the midst of a complicated and busy organization in which he seems to be almost completely lost. Most employers agree that a considerable period of time elapses before they can consider the new engineer sufficiently acclimated to his new environment to trust him without too much supervision in many of the things that he quite frequently feels that he is fully capable of undertaking. All young engineers should realize fully that in many instances your prospective employer does not actually know just where you eventually will land—even though he is fully appraised of your ability and has no particular fault to find with your performance. Actually, even though the particular business may be widespread in its operations and as stable as any business can be, the variation or trends of development are frequently quite unpredictable.

As a matter of fact—in many instances the unpredictable factor in business is responsible for the need of men with engineering training. Quite frequently the establishment has organized a training program for all new personnel that are to be developed for administrative or special lines. In some cases if the concern is principally engineering, your associates in such a program will all be engineers. In other cases such programs may include candidates who have accounting experience, business administration, outstanding employees, veterans who have demonstrated unusual ability, as well as prospective employees who have had an engineering education. Seldom now are such programs intended to test the courage and fortitude of the young apprentice. In other words—they are not set up to challenge his determination and attempt to break him. The programs are set up to be helpful, encouraging, and to provide an opportunity for the young man to observe all phases of the business and make himself at home, and in this he has his first realization of the importance of employee-relations.

Frequently the young engineer feels that the world is his oyster. He has a somewhat exaggerated idea of his own self-importance. During the years which we have just gone through it would be easy for the engineer to become quite cocky; the engineer has done a fine job during the war and he should keep on doing it, but this is little reason for the young engineer to strut his stuff until he has demonstrated his own personal ability.

Tolerance an Asset

One thing he must learn is to be tolerant of the other fellow who did not have the same opportunity that he did, and to listen and learn with patience and understanding. Nothing so quickly undermines the standing of the young engineer than his intolerance of the shortcomings of his associates in his own particular vocation because he will quickly find that he has similar shortcomings in the aptitude or skills which his associate may possess to a very high degree.

As mentioned previously, the young engineer finds himself in what seems to him to be a complicated organizational setup. Modern production methods which are highly centralized require large organizations and many hundreds and thousands of employees of various skills and aptitudes. As in the army, responsibility is divided along line and functional direction. The line organization is that of direct control and corresponds to the control exercised by the line officer in the army; the functional engineer or supervisor corresponds to the staff officer in the army. Generally speaking, most engineers will find themselves in functional capacities where they may act as consultants to others.

Nearly always unusual tact and diplomacy is required successfully to coordinate the line and functional responsibilities in a highly developed organization. Frequently the functional engineer is irked by delays and lack of direct authority on his part, and, as a result may seriously handicap himself in producing the results that he is striving to attain. Here again his ability to get along with other people may constitute his greatest asset. Perseverance, tact, and understanding, and the application of the fundamental principals of psychology will stand him in good stead if he expects to attain success in this type of activity. If he is willing to be liberal in giving credit to others and listens patiently to their problems and then tactfully presents his own solutions, he will be successful, but if he insists upon hogging the glory and assuming a critical attitude he will find himself thwarted at every turn without fully realizing what is happening.

If the young engineer is patient and understanding he will soon find that he will develop a friendly confidence which will permit him to put into execution remedies which he firmly believes in and eventually he will automatically find himself for all purposes in the driver's seat. He may then have his choice of remaining in his functional capacity or, if he cares and wishes to assume full supervisory responsibilities, he can become a part of the administrative and direct line organization.

Employer-Employee Relationship

One of the pressing problems in business generally today is the greater importance of understanding between management and labor. Technological changes, introduction of mechanization and controls are nearly always followed by industrial employee-relation problems and may eventually bring serious conflicts between the representatives of management and labor. In many cases the clearer understanding of labor problems on the part of the engineer might have obviated the trouble. Certainly the engineer's orderly and objective approach to such problems might be used advantageously if he takes the time to provide the background and prepare himself for such contingencies. I know that speaking for myself, the application of the Golden Rule and a frank, honest, and complete exposition of the facts have gone a long way, both in preventing and overcoming difficulties of this kind. For myself I feel sure that in the future the engineer is going to find himself in the capacity of mediator in many of the disputes between labor and management.

Advantages For Engineers

Recently in a statement prepared by the Lehigh Alumni Bulletin Dr. E. G. Grace, Chairman of the Board of the Bethlehem Steel Company stated: "Many of this country's leading business executives have been men with engineering training. Many a college-trained engineer finds his usefulness in work that lies beyond the purely technical field. Often he advances to an executive position in which the duties are largely administrative, requiring a

broad knowledge of business principles and the ability to organize and direct the work of others. Above all, he must have the sound judgment to make wise decisions.

The fact that the engineer is so often called to responsibilities of a non-technical nature emphasizes the need for his training to include study in economics and business administration, as well as in the liberal arts, to supplement his work in scientific and engineering subjects." This is a view that is held by many and it is important to the young engineer, even in his undergraduate days, that he endeavors to prepare himself for these responsibilities.

If any of you men feel that you have a flair for administrative work and are willing to accept responsibilities of this character, then you should take every opportunity that may present itself to do those things that will help you in later life. This may mean more attention to elective subjects while you are still an undergraduate, or it may mean that you will devote your time to extension courses after you have graduated, so that you may have a good speaking acquaintance with economics, business law, psychology, accounting problems and other related subjects that will help you more completely to understand the fundamentals of business. It will help you in your approaches to your boss and your dealings which involve management generally and you must all remember that it is just as important to be able to handle top management as it is to be able to handle the most complicated technical problem.

Ben Franklin Quoted

In closing I want to refer you to a quotation written by Benjamin Franklin in 1780 which appeared on the cover of the Saturday Evening Post on January 19 of this year. This quotation was taken from a letter written by the "most civilized man of his day" as Franklin has been called, to Joseph Priestley on February 8, 1780, when Franklin was the nation's representative in France. Following is the quotation:

> The Rapid Progress True Science now makes, occasions my regretting sometimes that I was born so soon. . . . It is impossible to imagine the Height to which may be carried, in a THOUSAND YEARS, the Power of Man over Matter. . . .
>
> O that Moral Science were in a fair way of improvement, that Men would cease to be Wolves to one another, and that Human Beings would at length learn what they now properly call Humanity!

Each time I read this quotation it impresses me more and more. It is little wonder that Franklin is now remembered and will always be remembered for his wonderful thinking and the mind which he possessed. If Franklin felt that way less than 200 years ago, I often wonder how he would feel were he alive today. Late last summer we all remember the report of the effects of the atomic bombs at Hiroshima and Nagasaki. Volumes have been written on the terrific implications which this scientific development may have in store for us. Fear of its destructability is counteracted by its hopes for commercial application in the future. Its control from the standpoint of destruction we must leave in the hands of the scientist, statesman, and politician. Its development for the good of humanity—while still in the hands of science, will be rationalized to a large extent by the practical engineer.

No one knows at the present time where this will lead us or how long it will take, but after all, this is only one example of the many radical changes which have taken place during the past few years. There seems to be almost no end to the things which can and probably will be done by the scientist and engineer of the future. It will be the job of you men and thousands of others who have selected engineering as their chosen profession to see that these forces are used for permanent good. It is not only your privilege but it is your responsibility to see that you prepare yourselves well to do a job that the rest of the world may be proud of.

The New Fabric, Ramie — A Terror To The Price System

By Stuart Chase

Reprinted from The Melbourne (Australia) New Economics

Ramie is a fibrous nettle plant, painful to the cross-country hiker, but far more painful to our money system. This plant can be grown with a 22-inch fiber, 1,500 pounds to the acre (against 150 pounds of cotton). Two or three crops a year are possible in the South. It is harvested like wheat, by completely mechanized methods.

Ramie can be prepared for spinning by full automatic factory processes, from stacks, with no human hand assisting. Spun, it makes a cloth seven times as strong as wool, several hundred times as strong as cotton.

Ramie has a lustre like silk or linen, and takes dyes beautifully. It is stronger wet than dry. It can be made into light, fine paper, too strong to be torn by the human hand. In mass production the cost of both textile and paper is far below any competing commodity.

Here, in the real world is a discovery capable of immeasurable raising the standard of living. Science lays it on our door step. Science is ready to develop it, splendid—and terrible. Splendid for humanity—terrible for our economic system. For, when Ramie goes on the market—

It will ruin cotton-growing,
It will ruin wool-growing,
It will ruin flax-growing,
It will ruin pulpwood producing,
It will ruin cotton manufacturing,
It will ruin wool manufacturing,
It will ruin the silk industry,
It will ruin the rayon industry,
It will ruin the linen industry,
It will ruin the paper industry,
It will ruin one million jobs,
It will break thousands of banks,

It will undermine insurance companies, savings banks, trusts, estates, foundations and endowments by the hundreds. (Shades of Atomic energy!)

You see, the price system is simply not capable of absorbing such a shock. Bankers and money men will fight ramie as they fought rayon for twenty years. But ultimately it will break through. It will break through incompletely and badly organized. Its promoters will grow very rich, and old line economists will shout, "You see, machines do not destroy jobs, they create more jobs."

But physics is stronger than metaphysics in the long. And the industries listed above, will grow poorer, if indeed not completely bankrupt.

This will surely happen one of these days—unless the engineers of the country are given an opportunity to completely remodel our money system in the meantime.

Schedule of Minimum Fees and Salaries For Professional Engineers in the State of Missouri

Prepared by a special Public Relations Committee composed of C. G. Rousch, Chairman, L. A. Byron, J. L. Wood, N. R. Beagle, W. E. Ralls, C. W. Eshbaugh, W. B. Roush, M. T. Isaacson, O. J. Lamb, W. Barrett and H. W. Watkins.

FOREWORD

The progress of Mankind and Nations, from the distant Stone Age to the present, has been tied in directly with the progress in man's ability to understand the laws of Nature and Materials of the Universe, and his ability to harness these to his use. This knowledge and these developments have been possible only by the untiring devotion of the scientific mind to the work in a chosen field and the Engineer's ability to adapt the discovered facts to uses beneficial to all the people.

As a result, the burdens of all Mankind have been lightened and Nations have progressed, prospered and decayed in direct proportion to these discoveries and developments, and the manner in which they have been used.

The Missouri Society of Professional Engineers desires to give recognition to the Engineer, add a contribution to his social and economic status, and better inform the public of the true meaning of the term "Engineer" as it applies to the professional man. The Professional Engineer and Engineer-in-Training can best be determined by briefly, but comprehensively, describing the duties performed by such men and giving the educational preparation, experience and personal qualifications necessary to perform such work adequately.

The herein listed activities, minimum salaries and minimum engineering fees are considered reasonable and fair compensation in the State of Missouri. Recognition is given to the educational, personal and experience qualifications necessary for an Engineer to perform properly such work to the maximum benefit of his client, employer and the public welfare.

Acknowledgment

The Missouri Society of Professional Engineers wishes to acknowledge with gratitude the assistance obtained from the many studies of this problem made by other states, technical societies and organizations. A large number of these analyses and reports were studied by the Committee for the Missouri Society of Professional Engineers in formulating this Schedule, and many of the ideas contained herein were derived from these reports.

C. G. Rousch
President, Missouri Society of Professional Engineers.

Definition of "Professional Engineer"

As specified by the Missouri Registration Law for "Architects and Professional Engineers," a Professional Engineer shall mean any person who is technically and legally qualified to practice Professional Engineering, and who is authorized under this Act to engage in the practice of Professional Engineer.

The Missouri Society of Professional Engineers adds further interpretation for the person who attains truly professional standing as one who not only qualifies by the law, but also gives of his time, talents and energy to improve the community and his fellow man in his sphere of contact, by taking an active and constructive part in the moral, cultural and civic life. He shall work toward the goal of better education and training for his profession.

This activity is usually in addition to that for which he is normally directly compensated.

Schedule of Minimum Salaries and Grades of Professional Engineers in Missouri General Definitions

(a) The Schedule of Salaries for Professional Engineers, their Engineering Assistants and Engineers-in-Training, is based on continuous employment for twelve (12) months or longer. It is also based on service at the employee's home station, and should be supplemented by allowances for trips to other locations; such as, travel and living expenses of not less than $5.00 per day.

(b) When it is necessary to move the official headquarters or home of a Professional Engineer for the benefit of his employer, the expense necessary for moving household goods and personal effects, not exceeding 7000 pounds, should be paid by the employer, in addition to the travel and subsistence expense of the Engineer and his immediate family, for a period not to exceed fifteen (15) days. The travel and shipping route should be by the most direct, recognized common carriers.

(c) In the preparation of these schedules, consideration has been given to the type of work performed, the size of the organization or community, and the degree of education and experience required to perform different kinds of engineering work.

In general, the division is made between the Sub-Professional and the Professional grades where the Engineer is given considerable latitude for independent thought and action, and where his contacts and activities are beginning to be expanded beyond those of his immediate group or company association to that of other departments, businesses and the public.

How Classification Determined

(d) The classification of an individual does not imply that he is unqualified to assume the responsibilities and duties of any higher grade; neither should mere length of service be regarded as the sole basis for the determination of grade and salary, but the actual activities and abilities of the individual should be governing factors.

(e) It is deemed inadvisable and impossible in a Schedule of this kind to give too much detail for each grade. To do so would make the schedule too voluminous and unwieldly to serve its purpose.

An attempt has been made to list in a broad sense the various grades with inclusive, general activities and minimum requirements. The specific organization can use the schedule as a general guide and designate proper nomenclature for the

different grades and specific duties as they apply to the organization.

(f) *Application of Schedule.*

(1) This schedule is considered fair for all organizations operating in the State of Missouri employing Engineers, and the committee suggests serious consideration be given the report by all such organizations.

(2) Proper legislation should be considered and enacted to apply this Schedule to the use of State, Municipal and County organizations employing Engineers.

(3)This Schedule is also deemed proper for consideration by Federal organizations employing Engineers.

Schedule of Minimum Salaries for Professional Engineers, Engineering Assistants and Engineers-in-Training for the State of Missouri With Grades and Definitions.

The salaries, activities and qualifications requirements, as prescribed, are considered as minimum and proper for Engineers in the State of Missouri. Four classifications are used, based on the size and type of the organization, municipality or county, as it is realized these conditions directly influence the cost of living, the over-all technical requirements and the ability to compensate the Engineers.

The fact is recognized, as the Engineer remains with a particular kind of work and in a particular grade, his proficiency and value to his employer increase, and his compensation should be regularly increased within the limits prescribed between a grade and the minimum for the next higher grade.

NOTE:—*Scholastic credit given for each successful year of engineering study is computed as one year's experience, as stated in the Missouri Registration Law.

**The Engineer-in-Training is defined as the Engineer seeking full standing as a Professional Engineer by having successfully passed the technical requirements of the Registration Board and who is then working for the required profesional engineering experience as specified by law in Missouri, for full standing as a Professional Engineer.

Engineering Organizations

AAA:—A Type AAA organization is one in which qualified engineering talent is required to fill practically all the positions grades cated.

This type would include the Federal Service, State Highway Department, and Engineering Departments of cities serving populations of 400,000 and up and similar county organizations, large public utilities, manufacturing or industrial concerns and special engineering organizations performing a high degree of technical service.

AA:—A Type AA organization is one in which qualified engineering talent may be required to only partially fill all the position grades indicated.

This type would include other state departments requiring a limited engineering organization, and engineering departments of cities serving population of 100,000 to 400,000 and similar county organizations, medium-sized public utilities, manufacturing or industrial concerns, and medium special engineering organizations performing technical service.

A:—A Type A organization is one in which only a few of the grades of engineers as listed are required.

This type would include engineering departments of cities of 18,000 to 100,000 population and similar county organizations, small public utilities, and manufacturing or industrial concerns requiring technical service.

B:—A Type B organization is one requiring only two or more grades of engineers as listed.

This type would include cities of less than 18,000 population and similar county organizations and industry.

Note: In order to safeguard life and property, to promote and protect the peace, health and safety of the people, and, generally, to conserve the public welfare, it is recommended that, regardless of the size of the organization, the engineer in responsible charge of the work should be at least equivalent to Grade 3.

Sub-Professional

Grade A

General:—Under detailed supervision to assist; with little or no experience; non-technical routine work.

Activities:—To assist on engineering work in field, shop, office or laboratory; simple field work as chairman, or flagman; simple arithmetical calculations, tabulations, tracing and index filing; and routine measurements.

Requirements:—Education equivalent to graduation from high school; and

Aptitude to acquire promptly a working knowledge of office or field engineering methods, equipment and terminology; personal qualifications of reliability, neatness, accuracy, cooperativeness, good citizenship, and compliance with written and oral directions.

Grade B

General:—Under immediate supervision to assist in semi-technical routine work requiring experience.

Activities: — To assist on engineering work in field, shop, office or laboratory; serve as rodman or head chairman; to make routine technical computations; to set up and conduct simple tests under guidance; make simple observations and sketches and serve as assistant inspector for minor engineering jobs.

Requirements:—*Education equivalent to graduation from high school plus approximately two years progressive experience on similar engineering work; and

Ability to do simple drafting, office, field or laboratory work; personal qualifications of reliability, neatness, accuracy, cooperativeness, good citizenship, compliance with written and oral directions, and faculty of getting along well with others.

Sub-Professional—Engineer-In-Training

Grade C

General: — Under general supervision, technical and routine work requiring simple fundamental engineering knowledge.

Activities: — To assist in engineering work in field, shop, office or laboratory; make accurate engineering computations of moderate difficulty; inspector for simple projects; make, tabulate and interpret simple engineering tests and observations; prepare simple drawings and accurate tracings; and serve as instrument man or laboratory assistant.

Requirement: — Graduation from a technical college of recognized standing; or

*Education equivalent to graduation from high school, plus about four years of progressive experience on similar engineering work; and

Working knowledge of important sources of engineering information and mathematics applicable to particular type of engineering involved; personal qualifications of integrity, reliability, neatness, industry, accuracy, cooperativeness, good citizenship, compliance with written and oral directions, and faculty of getting along with others.

Grade D

General: — Under supervision with limited technical responsibilities permitting little independent action.

Activities: — To apply engineering principles to the solution of minor engineering problems and to lay out simple work for others and supervise them at their work, but with little opportunity for independent action or decision; to prepare technical reports of a minor nature; to make minor surveys, drawings, designs and estimates; to inspect minor construction or fabrication; to make routine tests of equipment, materials or processes; and to perform the usual work of survey instrument man, junior engineer, advanced apprentice, and the higher grades of draftsman.

Requirements: — Graduation from a

The suggested minimum salaries should be at the rates for the several grades of employment as follows:

	AAA	*AA*	*A*	*B*
		Annual Salary		
SUB-PROFESSIONAL				
Grade A	$1400	$1400	$1400	$1400
Grade B	1600	1600		
*SUB-PROFESSIONAL or ENGINEER-IN-TRAINING***				
Grade C	2000	1800	1800	1600
Grade D	2600	2400		
PROFESSIONAL				
Grade 1	3200	3000	2700	2400
Grade 2	4000	3800		
Grade 3	5200	4800	4000	3600
Grade 4	7500	6500	5500	
Grade 5	12000			

**NOTE: The smaller organization usually will not require the top grade of Engineer, and this grade has been omitted, as well as some of the intermediate grades for Class A and B organizations.

technical college of recognized standing, plus about two years of progressive engineering experience of similar work; or

*Education equivalent to high school, plus about six years of progressive experience on similar engineering work covering this and next lower grade; and

Ability to exercise engineering and technical judgment and skill; initiative and resourcefulness; supervise others so they work together effectively; and effectiveness in planning so as to utilize time of his group to best advantage with personal qualifications listed for the lower grade.

Professional

Grade 1

General: — Under limited supervision, with responsibilities over small group, to perform important engineering work requiring the exercise of independent action and decision and technical soundness of methods.

Activities: — To direct and execute difficult surveys and important engineering work in field, office, shop and laboratory requiring the exercise of independent action and decision, or supervise the work of a small group on engineering work of moderate importance; to check designs and layout; inspect construction, fabrication processes or manufacturing; to undertake original work or research on minor problems and to plan and conduct tests of equipment, material or processes; to purchase and inspect materials; to write specifications; to make reports on phases of projects; to confer with contractors, other departments and outside representatives relative to plans, specifications and quality of work being performed; and to perform the usual work of research assistant, engineer foreman, chief inspector, or assistant instructor.

Requirements: — Graduation from a technical college of recognized standing, plus about four years of progressive similar engineering experience, of which at least two shall be equivalent to Grade D Engineer-in-Training; or

*Education equivalent to high school, plus about nine years of progressive engineering work, of which at least three shall be equivalent to Grade D Sub-Professional; and

Ability to assume responsible charge of engineering work listed above; take an active part in professional and technical societies; show initiative, aptitude, resourcefulness, effectiveness in planning so as to utilize time of his group to best advantage, good judgment and good citizenship; and

Registration as a Professional Engineer in the State of Missouri, unless exempted by law.

Grade 2

General: — Under general supervision, with wide latitude of responsibility for important engineering work requiring specialized education and training.

Activities: — To supervise technically a moderately-sized group or division requiring technical knowledge and a sound experience record covering construction, design, processes or layout work performed by the group; to supervise the preparation of plans, specifications and contracts; to undertake comprehensive research and to supervise test work of importance; to render reports on complete projects; to be responsible for technical operation of the division; to perform the usual work of development, research or maintenance engineer; to instruct others in important technical study and work.

Requirements: — Graduation from a technical school of recognized standing, plus about six years of progressive engineering experience, of which at least two years shall be in charge of similar engineering work indicated for Grade 1; or

*Education equivalent to high school and about 12 years of progressive engineering work, of which at least three years shall be in charge of similar engineering work indicated for Grade 1; and

Ability to plan, design and supervise engineering work; moderate ability to meet the public; take an active part and interest in technical, professional and trade organizations; and personal qualifications as listed for Grade 1; and

Registration as a Professional Engineer in the State of Misouri, unless exempted by law.

Grade 3

General: — Under general supervision, with executive, technical responsibility for important work, requiring specialized engineering education and training and broad powers for independent action and decision.

Activities: — To be responsible for the correct technical performance of small engineering organizations or subdivision of a large organization; to supervise final designs, processes or operations of the group and be responsible for final execution of work of the group; to represent the organization or division in relation to the public, or other divisions and groups; or to function as associate professor in educational institution.

Qualifications: — Graduation from a technical school of recognized standing, plus about nine years of progressive engineering experience, of which approximately three years shall have been in charge of engineering work indicated for Grade 2; or

*Education equivalent to high school, plus about 15 years of progressive experience and technical development, of which approximately four years shall have been in charge of engineering work indicated for Grade 2; and

Ability to carry out and execute the engineering plans, designs and processes required for the group; ability to prepare and deliver a technical and practical address before a large audience; and to take an active leading part in technical and professional societies, trade association and civic groups; and

Registration as a Profesional Engineer in the State of Missouri.

Grade 4

General: — Administrative and executive charge; departmental or divisional management in the broad sense, requiring specialized training, education and experience.

Activities: — To be in responsible, professional and executive charge of a major division or department of a large or otherwise important engineering organization, manufacturing, production or processing project, involving planning, designing, supervision of construction, operation or maintenance; to give independent, critical or expert engineering advice for executive action; to assume professional and executive responsibility for the whole of a smaller engineering, industrial, utility or manufacturing project or operation; to perform the usual work of a division engineer, production engineer, principal assistant engineer, or (for a small organization) chief engineer or works manager; and to serve as full professor in a large, recognized technical school or research engineer.

Requirements: — Graduation from a technical school of recognized standing, plus about thirteen years of broad professional experience embracing a thorough knowledge of engineering and experience in business administration; or

*An equivalent combination of education and experience record; and

Ability to coordinate the activities of the various divisions of an organization; to have experience as a leader in the various commercial, civic, cultural, professional and technical activities of his community and profession; and

Registration as a Professional Engineer in the State of Missouri.

Grade 5

General: — Complete technical and professional charge, with responsibility for formulating policies and procedure.

Activities: — To have entire charge of, and responsibility for, an entire engineering organization comprising more than one division, and either of a large scope or engaged in more than one class of work; to determine and establish technical and administrative policies and procedures; to be finally responsible for all engineering or technical operations; and to perform the work of a chief engineer, or manager of a major engineering or manufacturing organization or director of a comprehensive research organization.

Requirements: — Graduation from a technical school of recognized standing, plus about eighteen (18) years of broad professional and business experience.

Recognized standing in engineering; thoroughly qualified in the affairs of the profession, the economic, cultural and civic affairs of his community; and a vital interest in the development of proper education and training of his fellow, engineer; and

Registration as a Professional Engineer in the State of Missouri.

Minimum Fees For General Engineering Services

These fee schedules represent the suggested minimum charges that are considered compatible with engineering service of the proper quality and scope.

Division A

1. Following is the schedule of basic minimum fees which should apply to general engineering services throughout the State (See table below).

1-a. As an alternate to the percentages given above, the charge may be based on actual direct cost of doing the work, plus 100% of such costs to cover overhead and profit.

2. The distribution or "breakdown" of the schedule as applying to the various percentages as given in the table, should be as follows: (All in percentages of the total fee).

Cost of Construction			*Basic Minimum Fees (%)*
Less than		$10,000	10.0 plus or per diem
$10,000	—	25,000	8.5
25,000	—	50,000	7.5
50,000	—	100,000	7.0
100,000	—	250,000	6.5
250,000	—	500,000	6.0
500,000	—	750,000	5.5
750,000	—	1,000,000	5.25
1,000,000	—	10,000,000	5.0
Over		10,000,000	4.5

Preliminary Estimates and Preliminary Reports	10% to 15%
Detailed Plans and Specifications	60% to 65%
General Supervision	40%
Basic Minimum Fee	100%

The percentages given above are to apply in those cases where only one or perhaps two of the services listed are required, as it is realized to perform only part of the complete work is considerably more expensive proportionately in direct costs to the Engineer than to carry through the entire project.

Should the Engineer perform only one section of the work as listed above, and later be given a contract to complete the project, credit would be given, on the total basic fee, of 50% to 65% of the original partial contract fee paid by the client.

3. Scheduled fees should cover engineering services, including preliminary estimates and preliminary reports; complete detailed plans and specifications and detailed estimates of cost; attendance at the opening of the bids; consultation and advice upon the award of the contracts; checking shop drawings and manufacturing prints; periodic visits to the project during construction (number of such visits necessary as determined by the Engineer); advice to and consultation with the Resident Engineer; final inspection and test of the work and preparation of "as built" drawings.

Line and Grade Surveys Not Included

The Schedule of Fees does not include lines and grade surveys; preparation of monthly and final estimates for contractors' payments; property, boundary or right-of-way surveys: shop, mill, field or laboratory inspection of materials; cost of test borings and other sub-surface explorations; or calculations of special assessments. These latter services to be furnished by the Client, or at the Client's choice may be provided by the Engineer at actual cost, including overhead of from 50% to 60% of the direct labor and expense cost.

The Engineer should furnish all necessary resident supervision, but the Client shall pay, in addition to the basic minimum fees, the actual payroll cost of such resident supervision as may be required, plus an overhead charge of from 50% to 60% of the payroll cost.

"Resident Engineer" is defined as the representative of the Engineer who has responsible charge of the construction work and spends a substantial portion of his time at the work.

4. Basic Minimum Engineering Fees should be used for bridges, buildings, power plants and electrical transmission, distribution and street lighting systems, sewerage and sewerage treatment improvements, water works and water treatment improvements.

Paving, sidewalks, heavy grading and extensions of water lines for local service should be subject to a reduction of one per cent from the above Basic Engineering Fees. These reduced basic engineering fees should include resident supervision, but do not include inspection for the various classes of work specified in this paragraph.

5. The above schedule is considered to be minimum fees for normal conditions and may be increased for difficult or unusual conditions.

6. If, after the Engineer's drawings and specifications are completed and approved by the Client, the Engineer is requested to change his drawings and/or specifications because of changes made by the Client, then an extra fee is suggested for making the changes. The extra fee should be based upon his actual payroll costs plus 100% of such cost.

If the work is abandoned before the Engineer has completed his work he should be paid a proportion of the basic minimum fee scheduled for each stage of the work corresponding to the amount of work the Engineers has done.

Services to Architects

7. Basic Schedule Fees may be reduced twenty-five per cent (25%) for services to Architects or other Engineers by mutual consent and agreement or where reciprocal privileges are accorded.

8. The Basic Fee includes the furnishing of six (6) copies or reports, plans and specifications (on paper). Additional copies should be furnished to the Client at cost. Original documents, surveys, notes and tracings are and shall remain the property of the Engineer.

9. The minimum fee for "Preliminary Estimates and Preliminary Reports," as set forth in preceding breakdown of the basic fee, is not intended to cover engineering services in connection with preliminary investigations and reports involving detailed consideration of operations, maintenance and overhead expenses, or the preparation of rate schedules for the sale of utility service and consideration of the economic feasibility of such projects as municipally or privately owned electric or other public utilities of a competitive nature. Fees for engineering services in connection with preliminary investigations and reports of this nature should be not less than fifteen per cent (15%) of a basic minimum engineering fee (expressed as a percentage in paragraph two as applied to the Engineer's preliminary estimate of the project). Should the Engineer be engaged subsequently to furnish detailed plans and specifications and the general supervision of construction, a part of the per diem, or lump sum fee, for the preliminary investigation and report, equivalent to five to ten (5-10) per cent of the basic engineering fee, should apply as a credit on the basic fee.

10. Minimum Per Diem Fees

(a) Fees should be based on a per diem rate where the nature of the service to be rendered by the Engineer is such that a percentage fee is not adaptable or convenient; such as, consultation and preliminary investigations. The fee for the principal should be at the rate of $40.00 per day, with rates above this minimum commensurate with the nature of the service and the experience and the professional standing of the Engineer.

(b) Fees for services in connection with legal proceedings should be at the minimum rate of $50.00 per day for the principal, except that the minimum fee for appearance in court should be $50.00 per day or fraction thereof.

(c) All services of assistants, draftsmen, etc., should be paid for at actual cost plus one hundred per cent (100%) for overhead, "readiness to serve" and profit, or at an equivalent minimum per diem rate, and in either case plus "outside expense" at net cost. The term "outside expense" should include transportation and sustenance incurred by the Engineer or his assistants traveling in discharge of duties connected with the work, and should include the net cost of incidental expenses such as telegrams, telephone toll charges, extra reproductions of prints or photos of drawings, specifications and other documents required for the proper execution of the services for the Client.

11. *Lump Sum Fees.*

(a) Fixed lump sum fees should not be less than those computed on a per diem or percentage rate.

12. *Violation.*

(a) Non-compliance with the terms of this schedule should be considered an unethical practice.

(b) The practice of preparing preliminary estimates and reports without charge to the Client, in the expectation of being retained as the Engineer by the Client if the project is begun, is an express violation of this schedule.

Minimum Fees for Mechanical and Electrical Consulting Engineering Services for Building Construction

Division B

(Division B Schedules are supplementary to those of Division A.)

1. The following schedules of basic minimum fees should apply to consulting engineering services in the mechanical and electrical fields in connection with building construction.

One of the two following basic schedules should be used for determining fees:

2. The distribution or "breakdown" of the above schedule for partial or incomplete

services, as applying to the various percentages for the different cost classifications, should be as follows: (All in percentage of the total fees).

4. The above schedule should be interpreted as meaning a basic rate computed on the total construction costs incurred by the Owner for the execution of the work, not including fees for professional services. The Engineer's estimate of the cost should be the basis for the fee, if proposals by contractors for the work have not been received.

5. The above schedules are considered to be minimum fees for normal conditions and may be increased for difficult or unusual conditions.

6. *Explanation of Schedules.*

(a) Preliminary Studies and Estimates.

This section is intended to include conferences with the client regarding a proposed building program, necessary inspection of the site, examination of the preliminary construction drawings, preparation of preliminary or tentative sketches for the mechanical or electrical work, outline statement or report on the engineering phases of the proposed work and preliminary estimates of construction costs and operating costs.

(b) Design—Drawings & Specifications.

Method No. 1 applying to work done direct for Owners:

Cost of Mechanical or Electrical Construction	*New Work* Basic	Minimum	*Alteration Work* Fees (%)
Less than $10,000	10.0		12.0
$10,000 to 25,000	8.5		10.0
25,000 to 50,000	7.5		8.5
50,000 to 100,000	7.0		7.5
100,000 to 250,000	6.5		7.5
Preliminary studies and estimates			15%
Designs-drawings and specifications including preliminary studies and estimates			75%
General Supervision			25%
Complete Service			100%

3. Method No. 2 applying to work done for an Architect or another Engineer.

Design drawings and specifications, no preliminary work 2.5 3.0

Distribution of Work	*New Work*	*Alteration Work*
Preliminary Studies and Estimates	1.0	1.5
Design drawings and specifications, no preliminary work	2.5	3.0
Design drawings and specifications, including preliminary work	3.0	4.0
General Supervision	1.0	1.5
Complete Service	4.0	5.0
Advisory Supervision	0.5	0.75

This section is intended to include similar to those outlined under (a) and the following: necessary conferences with the client as required to facilitate the work, the preparation of complete drawings and specifications for the work, the checking of contractor's shop drawings and advice to the client regarding the selection of apparatus and material.

(c) General Supervision.

This section should include the necessary supervision or inspection of the work in the field by the engineer or his representative from the office of the egineer.

(d) Complete Service.

This section should include preliminary studies; surveys and reports with estimates of costs; complete working drawings and specifications ready for bids; drafting of forms of proposals and contracts; checking of shop drawings; preparation of monthly and final estimates for contractor's payments and general supervision of construction.

(e) Advisory or Partial Supervision.

This should include inspection of the work when called for by the client but not to exceed an average of two inspection visits per month. Any additional visits made at the request of the client should be charged for at the minimum rate of five dollars ($5.00) per hour plus travelling and sustenance expenses. This section shall also include the final inspection of the work.

7. Extra Engineering Services

If, after the engineer's drawings and specifications are completed and approved by the client, the engineer is requested to change his drawings and/or specifications because of changes made by the client, then an extra fee is suggested for making the changes. The extra fee should be based upon the actual payroll costs plus 100% of such costs.

If, after the engineer's drawings and specifications are completed, the work is abandoned, the engineer should be paid the minimum basic fee scheduled for each stage of the completed work.

If the work is abandoned before the engineer has completed his work, he should be paid a proportion of the basic minimum fee scheduled for each stage of the work corresponding to the amount of work the engineer has done.

8. The basic fee should include furnishing to the client not more than three (3) sets of the completed drawings and specifications prepared by the engineer for the work.

The engineer should be reimbursed at cost to him for furnishing additional copies of his drawings and specifications.

12. Violation

Fees are based on a per diem rate where the nature of the service to be rendered by the engineer is such that a percentage is not adaptable or convenient.

The minimum basic fee for the principal should be a charge of forty dollars ($40.00) per day, or five dollars ($5.00) per hour, plus travelling and sustenance expenses.

9. Minimum Per Diem Fees

Fee for service in connection with legal proceedings should be at the minimum rate of fifty dolars ($50.00) per day for the principal or any part thereof.

The minimum fee for testimony or appearance in court should be fifty dollars ($50.00) per day or any part thereof.

10. Free for Legal Services

The engineer may charge a lump sum fee for his services.

Lump sum fees should be based on the engineer's estimate of the cost of the construction work and should not be less than any of the minimum basic fees scheduled herein.

11. Lump Sum Fees

(a) Non-compliance with the terms of these schedules should be considered as unethical practice.

(b) The practice of preparing preliminary estimate and reports without charge to the client, in the expectation of being retained as the Engineer by the Client if the project is begun, is an express violation of this schedule.

Revised Code of Ethics Being Considered for Adoption by the Missouri Society of Professional Engineers.

The MSPE subscribes to and dedicates itself to the strict adherence to the following code of ethics:

(1) To have as our prime motive the advancement of science in general, engineering in particular, and to strive to use our ability for the benefit of mankind.

(2) To be ever ready and eager to aid and abet the Missouri State Board of Registration for Architects and Professional Engineers in its functioning and especially in its administration of the law governing professional engineers.

(3) To refrain from undertaking any assignment beyond our capability unless it is conscientiously determined the task can be successfully accomplished.

(4) To bear an unselfish attitude toward one another, aiding and assisting one another, aiding and assisting each other. To be prompt with just and deserved praise and slow to condemn a fellow Engineer, and then only on account of his lack of ability or the use of unethical practices.

(5) To compete for engineering work and employment only on a fair and sound basis.

(6) To seek only just and equitable fees or compensation for professional services and perform such services faithfully, conscientiously, loyally and devotedly.

(7) To be considerate, moderate and dignified in advertising professional capabilities.

(8) To regard the interests of employers and clients on a parity with our own.

(9) To actively participate in civic and charitable programs in order to furnish preliminary professional advice, when necessary, in order that public works projects may be proposed on a sound engineering basis.

(10) To be ever on the alert to endeavor to impress upon the public that

Engineering is a Profession and that an Engineer, in fact, is a professional man. *Members Are Urged To Study This Proposed Code.*

Missouri Requirements For Registration

(Excerpts from Law of Missouri Covering Registration of Architects and Engineers.)

"*Section* 11. *Applicants for registration —requirements.* — No person shall be eligible for registration as an architect or professional engineer unless upon satisfactory evidence being submitted to the respective division of the Board to which application is made for registration that he be at least twenty-one years of age and of good moral character. In addition he shall furnish additional requisite evidence that such applicant is qualified:

"(a) Graduation from an approved course in architecture or professional engineering in a fully accredited school or college approved by the Board as of satisfactory standing; and a specific record of an additional four years or more of active experience in architectural or professional engineering work of a character satisfactory to the division, to which such application for registration is made; or,

Non-Residents

(b) In lieu of the requirements contained in paragraph (a) of this Section, a specific record of eight years or more of active experience in architectural or professional engineering work of a character satisfactory to the respective division of the Board to which such application is directed and successfully passing a written or oral examination in the applicant's particular field; or

"*Section* 17. *Exemptions.* — The following persons shall be exempt from the provisions of this Act, to wit:

"(a) A person not a resident of, and having no established place of business in this State, practicing or offering to practice here in the profession of architecture or professional engineering, when such practice does not exceed in the aggregate more than thirty days in any calendar year; *provided,* such person is legally qualified by registration to practice the said profession in the State of his established residence, and that the requirements and qualifications for obtaining a certificate of registration in such State are not lower than those specified in this Act.

"(b) A person not a resident of, and having no established place of business in, this State, or who has recently become a resident thereof, practicing or offering to practice such profession herein for more than thirty days in any calendar year, if he shall have filed with the proper division of the Board an application for registration and shall have paid the fee required by this Act. Such exemption shall continue only for such time as may be required for the consideration of application for registration; *provided,* that such a person is legally qualified to practice said profession in the State of his previous residence, and that the requirements and qualifications for obtaining a certificate of registration in such State are not lower than those specified in this Act. *Provided,* that in the case of any architect or professional engineer who has been a citizen and qualified elector within any county or municipality not within but adjoining this State for a period of one whole year next preceding the effective date of this Act, and who has for a like period maintained his office or place of business in any city in this State having 75,000 inhabitants or more, and nearest his place of residence, the Board may grant to such person a certificate to practice in this State either as an architect or professional engineer upon such terms and under such conditions as the Board may prescribe. *And provided further,* that except as in this sub-paragraph (b) of Section 17 provided, any non-resident architect or professional engineer duly authorized to practice his profession in the State of his residence and who desires to engage in his profession in this State, as provided in and subject to the limitations and restrictions of this Act, shall first apply to the Board for and secure a temporary permit authorizing such practice, which temporary permit the Board may, in its discretion, issue on payment of a temporary permit fee of ten dollars ($10). No temporary permit shall be valid for a longer period than sixty days next following date thereof, and not more than one temporary permit shall be issued to the same applicant during any continuous period of twelve months from date of the last preceding temporary permit issued to such applicant.

Supervised Work

"(c) Any employee of any architect or professional engineer registered under this Act whose work is done under the direction and supervision of his employer and for which such employer is responsible.

"(d) Land surveyors whose work includes surveying of areas for their correct determination and description and for conveyancing, or for the establishment or re-establishment of land boundaries and the plotting of lands and subdivisions thereof, but does not include any designing or supervision of construction.

"(e) Landscape architects, landscape engineers, city planners and regional planners, in so far as their work concerns consultations and preparation of master plans of parks, land areas or communities, or the preparation of detailed plans and supervision of planting, grading, walks and paving, and such minor structural features as fences, steps, walls, pools, and garden structures, normally included as a part of their work, where such structural features could not constitute a possible menace to life, health or public welfare.

Work Done For Self

"(f) Nothing contained in this Act shall prevent persons, mechanics or builders from making plans, specifications for, or supervising the erection, enlargement or alteration of buildings or any parts thereof to be constructed by themselves or their own employees for their own use, nor shall any provision of this Act prevent persons, mechanics or builders in the regular and continuous employ of any person, firm or corporation, from making plans specifications for, or supervising the erection, enlargement or alteration of buildings or any parts thereof to be owned by or leased to such person, firm, or corporation, unless the same shall endanger the public peace, health and safety; *and* drawings for such construction are signed by the author thereof in his true name followed by such title as he may be lawfully authorized to use; nor shall this act be construed as in any way affecting superintendent, inspectors, foremen or building trades craftsmen while performing their customary duties; and nothing contained in this Act shall be held or construed to have any application to the constructing, remodeling or repairing of any building or other structure outside of the corporate limits of any city or village, where such building or structure is to be, or is used for residential or farm purposes, or for the purpose of out-building, or auxiliary buildings in connection with such residential or farm premises; nor shall this Act apply to the constructing, remodeling or repairing of any privately owned residential, commercial or industrial building or structure inside or outside of the corporate limits of any city or village unless such building or structure, or the remodeling or repairing thereof provides for the employment, housing or assembly of ten or more persons or covers over twelve hundred square feet of ground area with height to upper most ceiling over thirty feet or two habitable stories above basement, and with cubical volume over twenty thousand cubic feet.

"(g) No provision of this Act shall be construed to require the registration hereunder of any person engaged in his own behalf or as the employee or agent of another in the operation of any locomotive, stationary engine, marine engine, or power plant, as a prerequisite to any such operation or employment.

"(h) The provisions of this Act shall not apply to any person employed by or doing inspection and service work for insurance inspection and actuarial bureaus, insurance companies or agents.

"(i) Engineering work of a technical character similar to that of a professional engineer when not for hire to the public and when not in public employment. Engineering work and services as done by employees of a company engaged in manufacturing operations, which are incidental to the manufacture and sale and installation of the products of the company.

"(j) Notwithstanding any other provisions hereof, the provisions of this Act shall not be construed to apply to the practice of architecture, whether professional or otherwise, or to the practice of engineering, whether professional or otherwise, in the construction, remodeling or repairing of any privately owned dwelling house of any kind or character whatsoever; nor to the construction, remodeling or repairing of any multiple unit dwelling house, flat or apartment, which contains less than five units."

The End

Seventy-five per cent of the world's population are suffering from a serious lack of the necessities for healthful living. Yet the birth rate of this 75 per cent is about twice as high as that of the other 25 per cent.

I Am Technology — An Autobiography

A Fanciful Story of Fact

By a Peripatetic Engineer

Foreword—Technology Defined

The term Technology is used in this story with two meanings, one past and one present. The past meaning is, in a general sense, to include all human discovery, invention and progress in the field of science and the industrial arts from primitive man, down to the present time. This is the dictionary definition of Technology.

Later in the story the meaning shifts to the specific sense of the term Technology as a process of production which when once started, itself then controls all further operations.

Since technological processes of production are barely 50 years old, it is necessary to use both definitions in order to outline the underlying importance of Technology in social life and social progress.

Whether in its earlier role of discovery, invention and progress in the pursuits of livelihood, or in its modern role as a process of production. Technology is the means whereby men live and have lived. The stage of development of Technology at any given period of history, plus or minus the degree of its application, has always determined the General Welfare of man. In the past this has always been low, and relatively to what it could be, it is very little higher today.

However, the present advanced stage of development of Technology constitutes a guarantee of much higher living standards for all as soon as Technology is freed from its interference controls — all unnecessary restrictions on volume production. As North America progresses deeper into the social dilemma of the Power Age, an intelligent awareness of the vital role of Technology in social life has become a necessity, without which civilized life cannot go on.

Here, then, is the autobiography of Technology, written within the framework of our ancient, inherited institutions where it is still confined.

Record of the Rocks

When the creature that was to become Man, was yet a running, climbing Ground Ape, still descending from his remote arboreal Ancestry of the Mesozoic Era, I helped to make his perilous existence a little less perilous. I gave him his first tools and weapons.

I taught him how to crack open nuts with hand rocks, how to pry up boulders with stakes, in the search for insects, and how to use sticks and stones to add power to his bare hands when striking blows.

That was in the Eocene Period, at the opening of the Cenozoic Era, many millions of years ago. Geologists have not yet found the Remains of my presence then, but the records of Paleontology indicate that I was already upon the scene before the first sub-men arrived.

I taught the low-skulled, walking sub-man, *Pithecanthropus erectus* how to chip rude hammers, knives and flakers from flint, agate and quartz. That was in the Pliocene Period at the end of the Genozoic Era, before the First Glacial Age, at least a half million years ago. The proof of my preence then is scattered over the world, embedded deep in the rocks.

The mammoth, the giant beaver, the woolly rhinocerous and the sabre-toothed tiger still hunted abroad. I was with Man then, helping him to fight off his enemies, to get more food and to dispense occasionally with the necessity of playing Jackal to the more powerful beasts, after they had finished gorging on their kill.

First Tools

My tools and weapons of that period included several varieties of scrapers, borers, hand axes, choppers, awls, planing tools, darts, knives, spearheads and the hammer and bone anvil. With Neanderthaloid, the first family life began and the first *division of function* in the production of goods and services. Fire made all this possible and inevitable. It did even more. It assisted the mental development of Man. When he began to cook his food, this practice led to a shrinkage of the bony structure and muscles previously developed to masticate raw meat, etc. This created more room on the inside of his skull and facilitated the frontal development of his brain.

I, Technology, have always existed, both as an idea, and as a physical force. I am a real concept in the minds of men. The way I operate is this.

How I Operate

First, a physical need must exist, that is, a function must require fulfilling. The need and function have always preceded the thought. I then go into action as an idea to fulfill the function. I invent tools and devise processes. In turn these tools and processes react upon both man and his physical environment, bringing adaptations to both.

Being a functional idea, I, Technology, could not devise a tool or process beyond man's mental ability to understand, or his physical strength to use. It wouldn't work, because he couldn't work it. It would be no good to him. It wouldn't fulfill the requirements of function.

All this proves that I, Technology, am not a thing apart from man. I am not an abstract or occult concept above his physical horizon. Instead I am an integral part of him and his environment. I am the first effect and also the end product of man's physical needs. And man, physically, mentally and culturally, is the end product of my tools.

My Forebears

As I have told you, my operations began at an early date in the life of man. My original Sires were Nature and Physical need. They begot Trial and Error, who was my Mother and Empirical Knowledge, my Father. Unfortunately, I was not the only child of my parents. They spawned a large Brood. Among these were Superstition, Tradition, Greed, Shrewdness and Venality.

These latter grew into strong, cunning operators in a short time. They did not take to the same things I did. I was interested from the first in the *conquest of the physical world about me*. They went off on all sorts of odd tangents, exploring that egocentric, inner world of the intangible. They delved after abstract concepts. I was

interested in social progress. They were satisfied with the Status Quo.

My brothers and sisters were always discussing how to manipulate physical phenomena so as to maintain the Status Quo. This attitude of superstition, tradition, greed, shrewdness and venality was then, and is now, the source of my greatest difficulty.

Scarcity of Energy

Another factor which had always handicapped me in my struggles against the *natural scarcity* of the pre-power age, was the fact that I, Technology, never had command of enough *energy*. The forces of energy are the shock troops of Technology. Despite my skill in shaping tools, I had always been held down by this shortage of energy. By energy I mean power, the power to do work such as is derived in small amounts from human muscles, work animals, water wheels and windmills. The output I was able to produce was always geared down to the amount of power available from these meager sources.

I knew that the only tool with which I could ever hope to defeat Natural Scarcity, was *greater production*. This requires more power, i.e., energy, as well as better skills and implements. I had not been able to achieve this to any great extent, when suddenly, a Stranger came riding out of the East.

The Stranger's name was Scientific Method. He cast eyes on Trial and Error, and went for her, hook, line and sinker. Without ceremony or sanctification, Scientific Method kicked Empirical Knowledge out of the picture, and took Trial and Error to his Bed and Board. There was never a more fortunate Affair in the long history of Man.

A Prolific Union

It was a prolific Union too. Out of it sprang first, Observation, Research and Experiment, three beautiful Daughters. Then came that brace of stalwart Sons, Analysis and Synthesis. They always go together. If you hire one, you must also hire the other, or else you get only a half job done. These five children grew up together. They were endowed with intelligence and integrity to an outstanding degree. I, Technology, took to them from the start. Since then we have been inseparable.

After an interval, another little Stranger came to the House of Man. It was the last and greatest of the offspring of Trial and Error and Scientific Method. Its name was Scientific Knowledge. It has new characteristics never possessed by Empirical Knowledge. It is exact, organized and verifiable. It is easy to check into its source material and references to find inspiration.

Facts vs Opinions

One of the first ideas he produced was that of segregating Facts and Opinions into separate fields. This job had become necessary. Opinions had always tried to masquerade as Facts. This organized confusion hindered my expansion. I had to be able to tell the difference between the two. I, Technology, cannot operate with Opinions; I need Facts.

A Fact is described as a "Close agreement of a series of competently made observations of the same phenomena."

Of course, not all concepts can meet this rigid specification, because many of them are just Opinions. Since all opinions are outside the field of fact, they are equally invalid for my purpose and function.

However, we live in a "free country," and Science does not want to make it less free. Every man, therefore, has the inalienable right to be as mistaken as he wishes in blurting out his opinions. Since all mere opinions are equally invalid, his neighbor has the same right. The right, in truth to wallow in the anarchy of opinions appears to be among the so-called "Natural born rights of man."

However, man has another "Natural Born Right." That is the right to be protected from the anarchy of Opinion. When that anarchy overflows and produces dire Social Effects, the line must be drawn. Any man who parades forth his private opinion into the field of Public Social Problems, is often a *menace to the general welfare.*

Extraneous Energy Is Born

With the opening of the Industrial Revolution I, Technology, at last (especially in the Western world), came into possession of a superior set of tools with which to operate. I had Scientific Method, and a growing body of exact organized and verifiable knowledge. With these splendid tools it did not take me long to design the Major Tool I had always lacked. That was *Extraneous Energy*. With that tool I could surely remake the world.

Before I developed extraneous energy, I had designed the factory system of production. This sprang out of my much earlier idea of *Division of Function.* At first I burned wood. As the forests dwindled away I turned to coal.

Soon I learned how to use the expanding power of steam. Next came the internal combustion engine. I had learned how to use the molecular energy in fossil fuels. Natural Scarcity began to take it on the chin for the first time, as greater production entered the picture.

I, Technology, have now solved the problem of volume production. But I cannot work at my peak of efficiency, until production's twin problem of distribution is also put on a technological basis, in harmony with the means by which we are able to produce so marvelously. I, Technology, if given free rein, can find a way of balancing high volume production with equal volumes of consumption. Certainly my past unbroken record of results, constitutes unquestionable evidence that I have what it takes to break this bottleneck which so far has thwarted all our efforts to secure real and enduring prosperity for America.

A Prisoner

You see that I, Technology, have brought a new world of economics. The old ways of doing useful work I have revolutionized in just the past sixty years. But I, Technology, find myself imprisoned within the ancient, hand-tool institutions of the old world —the institutions which grew up under conditions of "Natural Scarcity." That natural scarcity was due to the past unavoidably slow rate of doing economic work in the pre-power Age. Those institutions have outgrown their usefulness. Yet today, those production-limiting institutions *control me*— they restrain my ability to make America abundantly prosperous.

If America wants me to create abundance, leisure, equal opportunity, I can do the job—for it is definitely a technological job. Those who think in terms chiefly of ethics, of politics, of economics in the fiscal sense, are blind to the nature of the problem— blinded by the institutions of the past which we in America have long since outgrown.

America can have freedom from want because I, Technology, can produce abundance and I can distribute abundance, IF I am given the necessary freedom to do so. But Americans will not have that full Abundance, or the Peace that can come only through the

broader distribution of abundance, so long as I, Technology, am chained to the customs, traditions and institutions of a bygone age.

All that is necessary is that I, Technology, be allowed to *increase the application* of my technique to the whole economic field—production AND distribution. It is as simple as that.

Do You Want It?

But first you Americans must WANT the benefits of full, balanced-load production and distribution. By that I mean, production not limited in volume because of our inability to get full distribution. Obviously unless and until Americans WANT this abundance, all questions of HOW to bring it about are futile.

But once the American people have the WILL to utilize fully the technology and the God-given natural resources existing on this Continent, no physical obstacle will then stand in the way of their attaining permanent prosperity. All that I, Technology, have to suggest hinges on the operation of our total social economy, as we already so successfully operate our production equipment.

Change Must Come—Now

Such methods of operation are the only conditions under which I, Technology, can *continue* to serve the American People, even in the field of production. The time has come in America when mass production must fall down, unless there is also full mass consumption in ever increasing tempo. To paraphrase the words of Abraham Lincoln, "America cannot continue to operate half technological and half politically feudal."

The change I, Technology, suggest is a job for leaders with highly specialized skills. I mean the best type of Professional Engineers. These are the men accustomed to making application of technology to human ends. The average, untrained American citizen would not know where to begin. To the socially-minded Professional Engineer, the task is as simple as designing a new process in any complicated industrial plant. Remember, that Modern America is literally a Power House situation, in which the abilities of the average politician or fiscal economist are grotesquely out of place.

If YOU, the American Citizen, will set Me, Technology, FREE—free under the only Master through whom I can work—the Professional Engineer, I, Technology, will build, right here in North America, the richest, the fairest and the very freest civilization the Sun has ever shone upon.

This new civilization will be the very first human culture in all the long, sorry history of Man, organized and operated for the Prime Function of *bettering Human LIVING.*

It's all largely up to You, the Citizens of America, to delegate the task to the Very Finest Professional Engineers to be found.

I, Technology, am at your service. And need I remind you, that in this Atomic Age, there is no time to lose?

National Issues — Washington Economic and Political Front

Our American Congress has been termed, "The greatest deliberative body in the world." During the weeks just past, that body has attracted an unusual amount of attention—perhaps we should say "notoriety."

It is no secret that the fumbling rules and procedures still tolerated by our Congressmen have been the cause of severe criticism. There is a feeling that these cumbersome ways of doing business are favored by many Congressmen. For one thing they make it less obvious when the people's representatives give perhaps too much consideration to matters not really connected directly with the real merits or faults of the proposed legislation. In short this lax way of handling provides a certain amount of "cover-up" when that is desirable.

In the so-called inner and more intelligent Washington political circles, it is felt, for example that while Congressmen were dealing with such problems as Labor, with the issue of continuing price control, and with the proposed loan to the British, their attitudes were not, in every case, based on the main issues at all.

Extraneous Issues Creep In

All this went on behind the scenes, say the critics, while the general economic welfare of the country, the future of world peace, and the stability of our national existence, were largely ignored in the ever more intense scramble over lesser issues of party, place and power.

Taking sides on, say the British loan, was too often just a way of attempting to aid or to discipline the British Labor Party, purely on the basis of what that party does or does not do in Palestine, or in its program to Nationalize English industries.

What is done in regard to labor legislation, may make or break this economy of ours. Yet it is thought that the attitudes taken by many Congressmen, indicated chiefly a desire to embarrass the Administration, one political party or the other, or to build up or tear down the labor movement. In each or all of these cases, a real consideration of the broad public welfare, it is felt, was subordinated to a concern for votes, or the bigger campaign contributions.

All this is a round-about way of saying that, in the view of many generally well-informed people—those in a position to know "the news behind the news,"—our National Congress is not doing a good job for the country. This is the seasoned judgment of those who can see through the smoke screen of oratory and cunningly phrased press releases to the contrary.

The Blame Is Not Easy To Place

How much of the blame can be placed directly on the shoulders of Congressmen, is a very different matter. Congressmen know, and it cannot be denied successfully, that sentiment on many basic issues is sharply divided throughout the country. This holds true, not only on the three issues referred to above, but also on most of the fundamental questions which are directly related to the long time well-being of the country.

Engineering trained minds are not supposed to attempt covering up the facts—on any issue. But politicians are not so particular. That is one reason why you see very few references, in the press, or elsewhere to the fact that the people of the country are far from united on economic and political issues. The universal confusion is made more confounding by the fact that there are no agreed upon terms to describe any

of the several widely varying points of view. Political labels mean practically nothing. Men who pride themselves on being possessed of a truly democratic faith are labelled "communistic" by one group, and "fascist" by another. If you call a man a communist, he considers you a fascist. And the man you think a fascist, probably puts you in the communist category.

Distorted News Pictures

To make matters worse, much of the political and economic information reaching the public is often highly colored to suit somebody's theory. At other times facts are suppressed entirely. Then there is that form of propaganda, commonly referred to as "censorship by selection," which means "playing up" the news we like, and "playing down" the items that are unfavorable to our point of view. Much of this so-called "voluntary censorship" is allegedly justified because of the belief that it promotes "national unity."

Of course, Congress has what are known as "rank conservatives," and also those who are referred vaguely as "liberals." These men are inclined to approach every question put before them with one or the other of these types of biases. If these gentlemen ever heard of the "Scientific Method" of determining and weighing the merits and demerits of proposed lines of action, the habitual, almost unvarying pattern of their voting record in Congress fails to show it.

Price Controls

The wide divergence of opinion in Congress on the best method of dealing with prices, has been one of the startling developments. Our representatives are in sharp disagreement as to whether the minority group of producers, who thrive on higher prices, should be favored in place of the majority of consumers, who probably would vote for lower prices, if they had anything to say about it.

A scientist or an engineer, viewing the spectacle of our Congress in action might well ask himself some such searching question as this: "Could a legislative body, made up largely of Professional Engineers do a better job for the country than that? Could engineers be more successful in separating facts from mere prejudiced opinions, when considering legislative proposals? Could engineers find it possible to free themselves from their own preconceived notions—ideological and otherwise—and proceed to deal with the conflicting claims of sundry pressure groups—good and bad—without prejudice and without fear or favor?

Are Engineers Really "Professional?"

In case the answer to such questions appeared to be in the negative, then it would seem that engineers have not yet become truly "professional" at all. For is it not true that the training given to engineers should be designed to free them from the emotional vagaries and the opinionated attitudes so common to the untrained rank and file?

Some may protest that the training of the engineer enables him to maintain a detached and truly scientific attitude only with reference to the objective, the physical and largely inanimate objects and materials with which he works in the practice of his profession. Such a conclusion would seem to belie the basic scientific character of the engineers' training. It is extremely probable that Engineers—engineers with a developed sense of social responsibility—could and would do a much better job than is being done in our Congress. It is certainly a mistake to conceive of "democracy" as a glorification, or even a passive toleration of the mediocre and the unfit in places of high public trust.

The long continued presence of American Armed Forces in China, is being widely questioned among the politically elite in Washington. The complaints on this score, made forcibly by the North China "reds," the U. S. State Department answered some months ago, by saying that our troops and equipment in China were necessary at that time to enable us to carry out our agreement to help evacuate the Japanese soldiers. Since that explanation is no longer valid, no one in authority can be found who will take the trouble to defend our present action. Obviously our soldiers are assisting dictator Chiang Kai-shek in his program of beating down the rebellious Chinese of the Northern provinces.

Of late it has become quite clear that our policy with regard to the Chinese rebellion, whatever that policy may be, has not been successful in settling anything. The comment in Washington indicates the fear that, instead of our trying to bring the two warring factions together, which at one time was our announced policy, actually we have been playing ball pretty consistently with only one side, which is the side of the Chinese War Lords.

One not unimportant effect of our apparent bad faith in China, has been that Russia has practically renounced her pact of cooperation with Chiang's government. This pact was made originally at our request, in what was supposed to be a program of bringing the two factions in China together.

The pending legislation dealing with the control of atomic energy, seems to be having difficulties in the Military Affairs Committee. Meanwhile that same committee is getting some unfavorable publicity in connection with Chairman May's alleged war-time activities. Meanwhile also, many persons mention the difficulty they are having in maintaining any semblance of confidence in the ways of government.

In spite of everything—or perhaps it is *because of everything*—this evil they call "inflation" appears steadily to be creeping up on the American people. But terrible as real inflation can be, some highly placed persons in Washington profess to believe that an inflationary spiral might be worth all the suffering it would cause, *if* that totally unnecessary tragedy should bring enough people to take "a good look at the persons, the institutions and the rules of the economic game which can bring such wasteful havoc to this rich and potentially prosperous nation."

Experience is said to be a "dear teacher," but, according to the old saying, "apparently many people will learn of no other."

Once we recognize that certain of our most distressing social problems are *technological*, the rest is easy. Engineers can find the answers to that kind of problem—if they are allowed to do so.

The increase in incendiary fires always has jumped at the time business begins slipping. The National Board of Fire Underwriters reports such fires are now jumping and that the fire loss this year will be the largest in history.

According to our information, from now on labor may be expected to prefer to bargain politically with government, rather than collectively with management.

EDITORIALS

Price Rocks the Boat

Recently, as not in decades, the eyes of the entire nation have been focused on our National Congress. The Congressional handling of the issue of continuing price control was truly a "show," such as would, in the words of one Washington news comentator, "have made P. T. Barnum green with envy."

However, this wholly indecent incident may serve eventually as a long over-due object lesson in government, if not in economics. For all thinking people must have realized, as the debate was going on in the Congress, that such intemperate wrangling is not engaged in by men of real ability who take their responsibilities seriously.

But we must not be too critical. Part of this problem lies in the fact, according to a certain prominent businessman, that, Economics is the science which nobody knows, but which just about everybody thinks he understands from the ground up. Such is the background for the undignified squabble over what to do with OPA.

The Truth of It

However, if the unvarnished truth were known, *price* would be seen to be an *enigma.* Price is an undefinable, highly elastic, extremely unstable and always unpredictable economic device which our highly mechanized industrial and business system uses universally as a *measuring stick* (!) to gauge the flow of some 200 billion dollars a year of goods and services going from producer to consumer! When the significance of that fact is realized, then we are face to face with the key problem of all economic problems—the problem of *price.*

By contrast, what engineer would think of using a slide rule, or a measure of any kind, whose space divisions were imprinted on a substance possessing the stretch of a rubber band? Yet in all our commercial transactions *price* performs the functions of a "rubbery" unit of measurement!

The technical side of economics is much too complex to discuss fully in these columns. Also it is miles over the heads of our elected government representatives who make not only political decisions, but also economic decisions, which may soon lead us either into some form of totalitarianism or into an atomic war.

Nevertheless, it is time somebody—somebody with enough scientific training to look forward into the future, rather than back at the past—is commissioned to dig into the real nature of our so-called economic problem, centering as it does around price.

Too much rocking of the economic boat in which we all live and move and have our being, is certain to end in disaster in this high power age, atomic bomb, or no atomic bomb.

David Lawrence in a recent copyrighted article published in The United States News, writing on the problem of how to reconcile the conflict between the legislative and the administrative branches of government, appears to think the case is hopeless. He says: "We have provided coordinate branches of the government, each of which can stand on its rights and convictions, and each of which *can point the finger of blame at the other.*" He concludes: "This is not responsible, but irresponsible, government.

Many a successful politician has declared to this effect: "I don't care what the newspapers and the people say about me, just so they *say something.* But when they say nothing, then I'm through and I know it." The same holds true of any individual, business firm, organization, or publication. So long as we can keep a lot of folks talking about what we do or don't do, we've got a chance. But when we're ignored, when we excite no comment, we're dead.

Looking Up To The Engineer

An engineer who gets around a lot tells us that he has talked confidentially with many of America's most successful industrialists, as well as outstanding statesmen, who are almost unanimous in expressing the view (in private, of course) that *it is up to the engineering profession* to provide the top leadership in this New Age of the Machine.

It is only the highly trained, socially conscious engineers, these men agree, that have what it is going to take to lead this country out of the "sticky slough of political and economic ineptitudes" from the effects of which our people have suffered so long.

From other sources also, comes much evidence that among even the most conservative national leaders are those who see that "the intellectual integrity which a thorough engineering training can develop, makes the engineer and the scientist the only dependable sources of truly constructive leadership in the present era. This type of leadership is essential now, because only an extremely high level of competency and understanding can make possible the continued existence of our nation in this Atomic Age."

That all sounds very nice, but there will be those who will ask: "By what *authority* can the Engineer aspire to such leadership?" And of course *there can be but one answer—"By the only authority which ever can give the technologist his right to assume great responsibilities in his field—and that is, his demonstrated ability to do the job as no one else could possibly do it."*

Certainly this is an idea well worth some thought by men of vision and understanding of social problems. Whether you as a reader agree or disagree, the reasons for your position would prove very interesting and helpful reading to those who receive the American Engineer.

Opportunity Knocks . . . Only When We Are Ready

Speaking before the newly formed Columbus Chapter of the George Society of Professional Engineers in February, 1946, Cherry L. Emerson, Dean of Engineering, the Georgia School of Technology, said:

". . . The United States has one-half of the real wealth of the Globe, measured in terms of automobiles, airplanes, and the production of mines, factories and farms. All of the real wealth, if put on a balance sheet, would show the United States as owner of about one-half, with the rest of the world's wealth divided among the other 70 odd nations of the world.

"And do the scientists, the inventors and the engineers operate the modern world which they have created? I am sure at this point you will agree with

me that they do not. Very seldom are they allowed to express an opinion as to how it should be operated, and more remarkable than all of this is the fact that they do not seem to have any particular interest in gaining control over the conduct of things, or even any very great interest in expressing an opinion about how these great productive forces should be administered."

Farther along in his address Dean Emerson expresses regret that the engineers and scientists have "no spokesman to proclaim the great things they have done."

But along comes a critic of this point of view, to ask, *"Just what* would the Engineers and Scientists *have to say, provided they did* have the kind of spokesman for which they long? Are Engineers and Scientists agreed as to the ways and means by which the technological product of their genius could be better administered than it is by the political, business and financial kings of the world in which we live?"

That is certainly something to think about. Reminds us of the observation of a good old Abbey of the 16th Century who spoke of the ardent desire of his parishioners to get into Heaven: "Of what use would be eternity to those who cannot well use a half hour."

It may very well be that when the technologists prove to the world that they have something really worthwhile to say about a better administration of molecular as well as atomic energy, the world will be willing to listen.

Engineers must be sure they know what they want to say on economic questions, before they can expect an attentive audience.

"1946 SURVEY OF THE ENGINEERING PROFESSION"

The Sub-Committee of the Engineer's Joint Council on the Economic Status of the Engineer, in which the National Society of Professional Engineers is cooperating, was sent on or about September 1 a questionnaire from which the latest information concerning the employment of engineers will be obtained.

Every engineer in the country, who is a member of the participating Societies, will receive a two page questionnaire to be filled out anonomously and returned in the self-addressed envelope which will be supplied. The survey is being conducted through the joint efforts of the Committee on the Economic Status of the Engineer and the Bureau of Labor Statistics of the United States Department of Labor. While the actual distribution of the questionnaire will be made by the Department of Labor, who are also tabulating the results, the analysis of the data and the release of the information resulting from this survey will be accomplished through the participating Societies of the Committee on the Economic Status of the Engineer.

The information requested is so organized and keyed together in the questionnaire that complete answers must be given, if valid results are to be obtained. It is urged that every member of the National Society of Professional Engineers give particular attention to returning the information requested at his first opportunity, in order that the results of the survey may be published at an early date. Particular attention should be given to supplying complete information since comparative values of the survey can be made only from fully completed questionnaires.

Simple instructions will be issued with each questionnaire at the time of distribution.

The entire engineering profession is looking forward to these results which will give valuable information, not only for the activities of the National Society of Professional Engineers but for future planning and analysis of programs affecting the profession.

Engineering Guidance

(*Continued from page* 4)

interested in the possibility of going to South America as a representative of an American manufacturer, Spanish or Portuguese or both will be useful. Formerly it was considered that French and German were essential for men depending upon reports of French and German research. It was felt that these reports should be read in the original language. However, today translation services make these reports available in English almost as soon as they are available in the original language, and the need for French or German has diminished. Furthermore, most of the basic research will be done henceforth in this country. However, the cultural value of language has not diminished.

Another question relates to the various steps of advancement for an engineer and what factors govern his progress. In this case the Committee feels that once the engineer has advanced beyond the cadet stage, his advancement is largely one of individual initiative, no two cases being alike.

The Committee is often asked whether a given field is over-crowded. The student is advised that there is always room at the top for a good man, but that any field is over-crowded with incompetents.

Still another question concerns the type of work a beginner does. This particular question is usually covered in the group conference following the general talk and is handled by the engineer in charge of the group, based upon his own experience.

Individual Conferences

At all school meetings the Committee offers to certain outstanding students the opportunity for an individual conference at the office or place of business of the speaker or of a Committee member. The student is then given an opportunity to see first hand what an engineer does in the every day practice of his profession. It gives him an opportunity to ask questions first hand and possibly will permit questions which a student would hesitate to ask in a group conference. About five percent of the students attending school conferences are granted individual conferences at a Committee member's office.

The Committee's record speaks for itself. In brief, it is as follows:

	No. of Students	*No. of Meetings*	*No. of Schools*
1937-8	175	3	3
1938-9	1977	15	13
1939-40	2334	23	22
1940-1	2275	28	27
1941-2	2057	25	24
1942-3	1923	22	22
1943-4	1540	17	17
1944-5	1715	18	16

BIBLIOGRAPHY

E.C.P.D. Engineering as a Career
Accredited Schools
Guidance of Young Men interested
W. E. Wickenden—College Career
in Engineering.
The Second Mile. A Re-Survey.

The founder societies all have bibliographies available covering their particular fields.

ACKNOWLEDGMENTS:

R. L. Sackett
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D. H. Moskowitz
Bureau of Guidance & Placement
Members of the Committee

MEMBER STATE SOCIETIES N.S.P.E. — *Officers and Directors*

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Kindly report any errors or omissions to the Editor.

National and State Society News

You'll Find NSPE's "Autobiography" Useful In Enrolling Prospects

The Headquarters Office in Washington has mailed every member of NSPE a copy of the Society's "AUTOBIOGRAPHY." This publication replaces the old pamphlet which sets forth the objectives of the National Society of Professional Engineers.

There has long been a demand from our membership for just this type of literature presenting a quick outline of the aims, objectives and need for our Society. This 12-page pamphlet has been prepared for use in explaining to prospects why every engineer owes it to himself to get into this organization.

Whenever you meet a Professional Engineer who is not a member, you will find this "Autobiography" can be used effectively as a "Sales Manual." By going over each item of contents in order, explaining and elaborating each point in your own way, you will get the story over more completely and quickly than without this guide.

Our stock of these "Autobiographies" is not large, but we will send a copy to any Professional Engineer on request. Local Chapters may secure needed supplies through their State Society office.

With this pamphlet in hand, it ought to be possible for every Chapter to put into practice the familiar slogan, "Every Member Get a Member."

The IES Goes To Quebec

The IES goes to Quebec on September 18-20 for its Victory Convention, sharing with its Canadian membership this annual event, which during the war years has been limited to technical conferences. One thousand delegates and guests are expected to attend the seven technical and general sessions which will be held in the Chateau Frontenac. Among the several social events, the resident's Reception and Banquet will mark the completion of the Society's 40th year during which the membership set a new high of 5,000, in some 32 Sections and Chapters.

The Convention will include an address by President A. F. Wakefield, F. W. Wakefield Brass Co., Vermilion, Ohio, who will be succeeded in office by G. K. Hardacre, Public Service Company of Northern Illinois, Chicago, beginning October 1st.

Engineering Education Society Changes Its Name —Sets New Goals For Engineers

The Society for the Promotion of Engineering Education, at its 54th annual convention, in St. Louis, June 20-23, the first meeting in three years, decided to adopt a new name for the organization. From now on the Society will be known as "The American Society for Engineering Education." At the same time it was voted to expand the organization to include the Engineering College Research Association. The enlarged union of the two societies, ASEE, will have 172 institutional members in addition to its 4,026 individual members.

Speakers at the three-day meeting stressed the need for engineers to assume more social responsibility, especially in the attainment of an orderly world society which shall be both humane and scientific.

Arthur H. Compton, chancellor of Washington University, in his address of welcome, pictured the engineer as destined to lead a cooperative movement toward a world society. He said, "Technical education is not enough; engineers must have a broad understanding of people and of the institutions that make for good government and good economic conditions.

Harry S. Rogers, president of the Polytechnic Institute of Brooklyn, and retiring president of SPEE spoke on much the same theme and said: "There is a growing conviction that engineers should have a better understanding of human relations generally and of the impact of technology on society and on social institutions." Speaking of engineering education he said, . . . "Engineering educators can and must play a part in the development of a more national program, but they can do this only by associating themselves with historians, economists and philosophers."

In his summary, Karl T. Compton, president of MIT, estimated that a cumulative deficit in the supply of engineers will increase to a peak in 1949, and will fall off to the year 1953, when the number of engineering graduates will catch up with the demand. The deficit in the number of available engineers in 1946, was indicated as 25,500.

Coming Events To Remember

National

Oct. 27, AM., NSPE Board of Directors Meeting, St. Louis, Mo.

Oct. 27, PM. Joint Meeting of the ASPE and the NCSBEE Boards of Directors, St. Louis, Mo.

Oct. 28, AM., NSPE Board of Directors Meeting, St. Louis, Mo.

Dec. 6, NSPE Board of Directors Meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

State

Sept. 20, Penna. State Executive Committee, Harrisburg, Headquarters Office.

Sept. 21, Penna. State Executive Board Meeting, Harrisburg, State Chamber of Commerce Building.

Dec. 6, Third Annual Meeting, Georgia Society of Professional Engineers, Atlanta-Biltmore Hotel, Atlanta, Ga.

Jan. 1947, Annual Convention of the Illinois Society of Professional Engineers, Abraham Lincoln Hotel, Springfield, Ill.

Feb. 12, 13, Annual meeting, Minnesota Association of Professional Engineers, St. Paul Hotel, St. Paul, Minn.

Feb. 14-15, Minnesota Federation of Engineering Societies, Exposition and Conference, St. Paul Hotel and Auditorium, St. Paul, Minn.

March 20-22, Ohio Society of Professional Engineers Annual Convention, Deshler Wallick Hotel, Columbus, Ohio.

All State publicity chairmen are requested to report details of the date and place of future State Society meetings, as far in advance as possible, for inclusion in this column. Also, any speaking engagements made by state officers, before NSPE or other engineering societies, would be welcomed as news for publication in the American Engineer. Whenever possible, we'd like to have mentioned the title of these addresses.

We further suggest that some State officer should assume responsibility for

getting in to the Editor, all news of activities within the state, which is thought to be of some national interest.

We try to close our forms on the 10th day of the month preceding that of publication. News items should be sent to the Washington office.

The Emergency Fund

We list below the names and addresses of members of NSPE who most recently have written letters to President Ritchie Lawrie, Jr., when sending in their contributions to the Emergency Fund.

G. T. Minasian, 104 Clark St., Glen Ridge, N. J.
Westchester County Chapter of the New York State Society of Professional Engineers.
Edward M. Peoples, New Carlisle, Ohio.
R. R. Bridgman, 190 S. Creek Road, Hamburg, N. Y.
J. L. Murphy, Inc., 340 E. 44th St., New York, N. Y.
Richard C. Ward, Corning, N. Y.
Frank S. Parker, 256 E. 49th St., New York, N. Y.
G. J. Patitz, 595 Madison Ave., New York, N. Y.
N. F. Ronan, 138 Clinton Ave., Nyack, N. Y.
Paul A. H. Weiss, Foughkeepsie, N. Y.
J. Leo Scanlon, Buffalo, N. Y.
W. A. Fouhy, 52 Wall St., New York, N. Y.
Geo. D. Smith, 136 Liberty St., New York, N. Y.

Chas. W. Burke, President of the N. Y. Society, is to be congratulated on the early results of his recent enthusiastic letter urging contributions to the Emergency Fund. As of July 22nd, the Emergency Fund total was $8,122.00.

"The Builders of the Bridge"

"The Builders of the Bridge" by D. B. Steinman has been selected by the advisory editorial council for use by our soldiers and sailors. 50,000 copies have been printed in the Armed Services Edition, and are being distributed to the Army and Navy installations overseas and military hospitals in this country.

An earlier book, "Bridges and their Builders," by D. B. Steinman and Sara Ruth Watson, was selected during the War by the New York Public Libraries Committee to be made available to the wounded and disabled in the military hospitals. The book was microfilmed and used in individual ceiling projectors with push-button control that could be operated by patients otherwise helpless.

Want An Engineer Job With Government?

The Headquarters office of the National Society of Professional Engineers announces that a liaison has been worked out with the National Roster of Scientific and Specialized Personnel. This arrangement enables members of NSPE to avail themselves of the placement services of the office of the National Roster.

In case any members or potential members of your State Society wish to avail themselves of this service, it is suggested that they forward to the Washington office of the National Society, a summary of their qualifications, together with indications of the type of placement they desire.

ILLINOIS

The next convention of the Illinois Society of Professional Engineers will be held in January 1947 at the Abraham Lincoln Hotel in Springfield, Illinois.

The Board of Direction of the Illinois Society of Professional Engineers has passed a resolution on behalf of the State Highway Engineers. Considering the fact that under the present indeterminable policies of the Division of Highways many professional engineers of long service records and experience may leave the State's employ, the resolution included the following:

"THEREFORE, BE IT RESOLVED by the Board of Direction of the Illinois Society of Professional Engineers, that we request the Hon. Dwight H. Green, Governor of the State of Illinois to give serious study toward improving the status of the professional engineer employed by the Division of Highways, (1) by establishing a more cooperative policy regarding the economic welfare of the professional personnel as it pertains to (a) salary adjustments in accordance with the Schedule of Minimum Fees and Salaries adopted by the Illinois Society of Professional Engineers, (b) expenses in line with cost of living index, (c) reimbursement for required change in locations of employment, (d) accumulatings of vacations similar to the procedure followed by the Federal Government; (2) that professional engineers be removed from outside spheres of influence so that they will know that satisfactory service will be rewarded. . . ."

Just before the period of registration for professional engineers under the grandfather rule ended on July 19, 1946, the applications had been coming in at a rate of about 300 per day. It is expected that the total registration may reach 12,000 to 15,000 engineers.

KANSAS

The Kansas Society of Professional Engineers has made very substantial progress in the first half of 1946. Our campaign for a strong License Law is in favorable circumstances. The Kansas Legislative Council, a Standing Committee of both houses of the State Legislature, has granted our request that they make a thorough study of the comparative status of legislation concerning the practice of Engineering in Kansas and in other states. This insures real consideration of the proposal; something that it has not had for a number of years.

As previously reported, the other engineering organizations of Kansas have joined with KSPE in forming an Engineering Council with Engr. C. Y. Thomas (Vice-President of KSPE) as President of the Council. The first objective of the Council is the enactment of an Engineers License Law that will be the equal of any in the nation. When that is accomplished we expect that the Council will find other fields of usefulness in coordinating the efforts of the various groups for common objectives until such time as the steadily expanding membership of KSPE makes such an agency superfluous.

Membership has risen steadily. On January 1 we had 56 members. Today we have 78, a gain of 39 per cent, which we feel is very satisfactory. The best information at hand indicates that there are approximately 600 Registered Professional Engineers at present actually located in Kansas, indicating that we have 13 per cent of the eligibles, which is far from what it ought to be, but not far from the National average; an average that we hope to help raise to 50 per cent before too many years have passed.

Registrants are increasing so rapidly and men are shifting from state to state so frequently that the above figure of 600 is at best a guesstimate.

A request for a Chapter Charter has been received from the Wichita engineers. For the present this Chapter will include engineers from the counties of Reno, Kingman, Harper, Harvey, Sedgwick, Sumner, Butler and

Cowley. This new organization of Professional Engineers brings to KSPE an exceptionally fine group of new members, many of them outstanding in their profession. The outlook for this Chapter is indeed very bright.

Judge Rules Services of Engineer are "Professional"

The Supreme Court of Minnesota has rendered a decision recently, which the Minnesota Association of Professional Engineers feels may prove to be very important to the future of Professional Engineers everywhere. This decision of the highest Court of the State appears to set up the engineer, through registration, on a professional plane, which would be recognized by the Courts generally. It is thought likely that this decision may have an important bearing on certain aspects of the Wagner Act.

The facts as they come to us are as follows:

During the past two years, a Mr. Larsen, an instructor in mechanical engineering at the University of Minnesota, has been performing, on his own time, some consulting services in industry. During the two years this instructor earned, on the side, something over $5,000.

The Director of the State Division of Employment and Security, attempted to have part of this extra income of Mr. Larsen's withheld for unemployment and other social purposes which are authorized in some cases under State law.

Mr. Larsen's employer resisted and suit was brought which finally reached the State Supreme Court. The Court held that no part of Mr. Larsen's compensation, earned outside of his teaching job, could be withheld. The Associate Justice rendering the decision stated that Mr. Larsen's services, as performed, do not fall within the scope of the ordinary master-and-servant doctrine. The decision also states that Mr. Larsen is a professional man and was called into consultation as one would call in a doctor or a lawyer in their respective spheres of expert knowledge.

The Judge went on to state that Mr. Larsen was not responsible for appearing at a certain hour and departing at a certain hour. He was not paid on a time basis. He was given the objective or design for which he was responsible and was thereafter held only for producing the results demanded and was not held for putting in any given amount of time. His pay, therefore, was strictly the pay of a professional consultant, said the Judge.

This is a case which is going to receive the careful consideration and analysis of the National Society of Professional Engineers, as well as of the Minnesota Association of Professional Engineers. When further information is available, it will be passed along to our readers.

NEW YORK

A good many New York State Chapters get out mimeographed bulletins, or News Letters which are mailed regularly to the membership. More recently a few Chapters have been mailing their publications also to non-member engineers in their territory, those who are eligible for membership. The results have been very encouraging. We understand that the Editor of the American Engineer, in Washington, is also very much interested in receiving copies of Chapter publications.

During the first quarter of 1946, a total of 82 industrial building plans, calling for an estimated expenditure of $28,840,000, were filed with the New York State Department of Labor. These figures compare with 24 plans and $5,241,000 during the same period last year, and 279 plans and $13,311,000 in the first quarter of 1942 (the previous all-time high).

State Senator Thomas C. Desmond, a member of Dutchess County Chapter, was the author of a four-page article, "The Coming Billboard Battle," in the April issue of the "Readers' Digest."

The Erie County Chapter is working hard to bring the 1947 annual meeting of the National Society to Buffalo.

The treasurer of the newly organized Engineers' Council, of Buffalo, comprising fourteen engineering organizations of the Niagara Frontier, is Carlos E. Harrington, a member of the Erie County Chapter. Newell L. Nussbaumer, also of the Erie County Chapter, is a vice chairman of the State Board of Examiners for Professional Engineers and Land Surveyors.

Dr. John C. Riedel, a member of the Kings County Chapter, recently took part in a debate on the question, "Do unions have a place in the professions?" Naturally Dr. Riedel took the negative side of the question. The occasion was a meeting of some 700 members of the Nurses Association of the Counties of Long Island.

The new secretary of the N. Y. State Board of Examiners, succeeding Roy G. Finch, is Newell L. Freeman, a member of the Schenectady Chapter.

OHIO

The annual election meeting was held aboard the boat house of the Cincinnati Yacht Club on the Ohio River June 24. There were a number of guests and visitors from the Northern Kentucky Chapter present.

Following a very fine dinner, President Martin called the meeting to order and called for the reports of the various committees. Reports were all presented orally. A resolution expressing regret over the untimely demise of Henry A. Nunlist was presented and unanimously adopted.

The Cincinnati Chapter had as a guest the president of the OSPE, Mr. A. C. Neff. Mr. Neff made a short talk covering the general activities of the State Society and the relationship of the State to the National Society and functions which the National Society is attempting to accomplish. He referred to the new committees established by the State and their activities.

Ohio Societies are getting results with their program of having State registration certificates handed out at a meeting of engineers, instead of having them sent by the Registration Board directly through the mails. At a recent meeting of the Dayton Chapter, Hal G. Sours, of the state board of registration, handed out 69 certificates, and stated that the idea of presenting certificates, which was started last fall at the suggestion of the Ohio Society of Professional Engineers, was working out very successfully. He also stated that this program was quite acceptable to the Board and that he, personally, hoped the procedure would continue. Perhaps this idea could be adopted by other State Societies.

There is no greater mistake than to leap the abyss in two jumps.—Lloyd George, in his War Memoirs.

Suggestions for Chapter officers: *Secretaries*—Send another dues statement to those members who just "put it off." *Program Chairmen*—Plan now for the fall and spring programs. *Membership Chairmen*—Keep your committee busy and don't try to do all the work yourself. And for *State Trustees*—Keep your chapters up to date on State Society affairs and relationships. —From the Ohio Engineer.

Speak Up, You Engineers

It is about time that the membership of NSPE speak up on this issue of an overall or super organization for Engineers. The recent flood of editorial and other articles appearing in the national, technical and engineering magazines proposing all kinds of urgently needed engineering organizations should be answered by the rank and file membership of NSPE. Every member of NSPE who is also a member of some technical society has the rights and the opportunity to clarify this issue.

Most every article outlines the specifications in such a way that NSPE is the only existing organization which can meet the specifications. Yet seldom is NSPE mentioned and never has it been cited as the organization to fill the bill. Any member of NSPE who really believes in NSPE could speak up and say NSPE is the organization for which you are looking.

Most every article intimates or openly suggests that if the existing organizations would all join hands there would be something like 100,000 members to start with. There is but one answer to this proposal and that is that the only organization that will ever be able to speak for the registered professional engineer will be an organization of registered professional engineers. No other organization has such a membership; therefore today NSPE is the only organization which even claims to speak for the registered professional engineer.

Make Them Take Notice

Every member of NSPE knows the above facts and practically every member is ready to support the above contentions. Therefore to put the idea over it would be far better if the membership would answer these articles with a letter than it would be to leave it to the officers of the local State and National Societies to do. The author of the article will pay little attention to the fact that the officers of the NSPE take him to task but if his own society membership in great numbers would write in he would sit up and take notice.

SPEAK UP!! We are not in competition with anyone. We have no axe to grind. We have nothing to fear no matter how far any technical council or any other federation of engineering societies goes in setting up a super organization, for none of them limit their membership to the registered professional engineer. No other definition of an engineer will stand the test of time and the courts except "An engineer is anyone who has been legally qualified to practice the profession by the laws of this State." Look at the history of the Medical Profession and convince yourself of this fact and then SPEAK UP and answer that recent article in your technical magazine.
—Editorial in the The Ohio Engineer

PENNSYLVANIA

Ritchie Lawrie, Jr., President of NSPE addressed an organization meeting of Professional Engineers at Pottsville on June 25th.

Efforts to organize a new Chapter at Williamsport, have been postponed until fall.

State President LeRoy F. Christman recently visited the Midwestern Chapter, at a meeting held at the Castleton Hotel, New Castle, also the Erie Chapter, which included a boat ride around the Bay and Lagoon, ending in a fish fry on Presque Isle.

The Committee to Cooperate with Industry recommends that engineers take advantage of every opportunity to speak before clubs such as Kiwanis, Rotary, Lions, etc., bar and medical associations and other professional groups. Not only will it be possible to get over some of the program of our society in these contacts, but newspaper publicity, if properly handled can still further these contacts, but newspaper publicity, if properly handled can still further spread the story which needs to be told about the contribution which the Profession has made, and is capable of making to the advancement of prosperity and general well being.

As of May 2nd, the State Society membership was 1,196. On June 22nd, it was 1,271, a gain of 75 members during the past month.

WEST VIRGINIA

Ezra Whitman, past president of the American Society of Civil Engineers, and a member of the firm of Whitman, Requardt and Associates, of Baltimore, Md., was the principal speaker at the spring meeting of the West Virginia Society of Professional Engineers, at Charleston, June 28th. Mr. Whitman's firm are the designing and supervising engineers of the Kanawha airport project and he spoke interestingly on the engineering and other problems involved in that project.

The Huntington district U. S. Engineers will draw plans and specifications for the 200-bed general medical and surgical hospital in Clarksburg, according to Lt. Col. John R. Sharp, district executive officer. Directives are expected at any time concerning this $2,500,000 hospital as well as a similar facility at Beckley. It is understood that Pittsburgh Engineers will direct construction of the Clarksburg institution, while the Huntington office will supervise the Beckley job.

"Highway Design," was the topic of an address delivered before a recent meeting of the Fairmont Chapter, the speaker being M. L. O'Neale, chief engineer of the West Virginia State Road Commission. He stated that passing hazards made the value of three-lane pavements questionable, the critical traffic density requiring four-lanes.

John A. Schubert, air conditioning engineer of the H. E. Neumann Company, of Wheeling, was elected president of the Northern Panhandle Chapter, at their June meeting.

Lee S. Ainslee, of the Hungton Automobile Club, presented the AAA "Take It Easy" campaign, prepared in the interest of greater highway safety, at the June meeting of the Huntington Chapter of the Society. The present campaign features "Take It Easy" stickers to remind drivers to slow down and use more caution.

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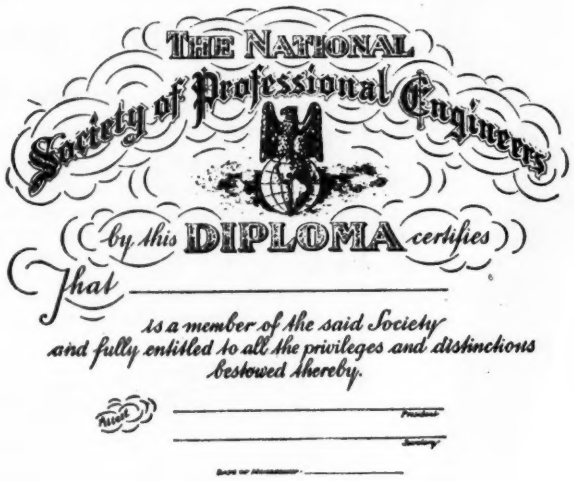
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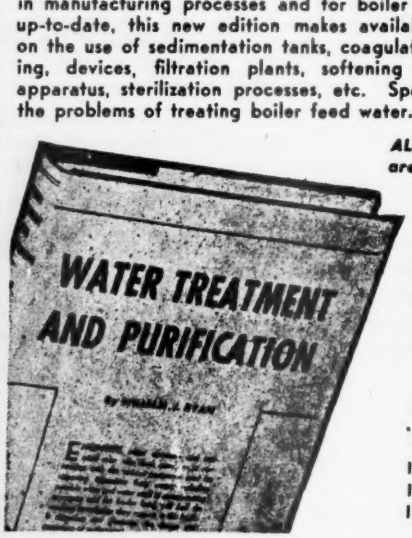

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What's New For Engineers

Requests for further information concerning any item mentioned under this heading will be promptly referred to the manufacturer. It would be appreciated if inquiries be addressed on professional or company letterhead.

Send Inquiries Direct to American Engineer,

#6 Church Street, New York, N. Y.

NEW DIRECT-ACTING SOLENOID VALVE

With the development of this new solenoid valve, this company has now made the advantages of an automatic electric valve available for a wide range of applications. The new valve combines immediate full flow with the ability to operate under differential pressures as high as 150 lbs. It can be used for all types of liquid level control, with hot and cold water, steam, oil and other processing liquids. This new valve is direct-acting—not pilot operated. The solenoid is conservatively rated and an ingenious lever arrangement provides ample power to insure positive opening of the valve. This single seat construction, the manufacturer points out, eliminates the trouble sometimes encountered with pilot operated valves when silt or other foreign matter freezes the piston. It also greatly increases the temperature range—enables the new solenoid valve to handle hot liquids or steam up to 365° F. In normal position the valve is closed; when solenoid is energized the valve opens instantly to full capacity. There is no time lag or delay, and no wire drawing of valve or seat that often results when valves open and close slowly. The manufacturer states that its dependable, trouble-free operation has been proved in test installations which have been in service for as long as 3 years. Some of the uses of the new valve in industrial plants include control of make-up water for boiler feeding, water cooling lines to air and ammonia compressors and to plastic moulding presses.

For further information address American Engineer, reference No. 512.

AUTOMATIC LINEAR DIVIDING MACHINES

This new booklet describes and illustrates this company's newly expanded line of precision and production machines for rapid automatic ruling of linear scales in either the inch or metric system. The more common line patterns are illustrated and a table lists the extensive variety of spacings obtainable. Detailed specifications are included.

For further information address American Engineer, reference No. 513.

FIBROUS AND PLASTIC SHEETS

Free production samples of sheets of new fibrous and plastic materials are now offered to manufacturers by this concern, from as little as 25 pounds of component ingredients. A specially developed experimental machine, which duplicates the output of full-scale equipment, makes this possible. The experimental machine retains full diameter and other vertical measurements of standard equipment. Any material adaptable to the wet machine process can be made into fibrous or plastic sheets by means of the experimental machine. The preferred thickness range is .031", though thicknesses from .007" to .150" may be produced. This has been successfully accomplished with cellulose, leather, asphalt, glass fibres, asbestos, lignin, rubber, phenolics, ureas, cork, vinsol, ground wood, flax, and others that were considered waste materials. This company produces fibrous and plastic boards by a special beater process which includes the wet laminating of many thin plies until they are built up into sheets of any desired thickness. The plies are laminated under high pressure without the use of adhesives or chemicals, then dried free from any tension. Fibres stay interlocked after fabrication, providing extra strength.

For further information address American Engineer, reference No. 514.

DECIMAL EQUIVALENT CHART

This company has developed, and now has available, and etched aluminum decimal equivalent chart, designed for attachment to standard types of drafting machines. The chart proper is 3 by 5 inches, has large legible lettering, is protected by durable Alumlite finish. The edges are formed to snap over the two parallel tubular supports on the K & E Paragon machine, and garter spring attachment is provided for the single center bar machines, such as Brunning Wallace, Elliot, etc. When mounted on the machine, next to the protractor head, the chart is in position for constant ready reference. Less fatigue for the draftsman, reduced chance for errors in decimal conversion, and a higher work output are among the advantages.

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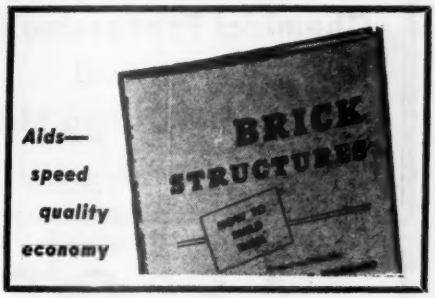

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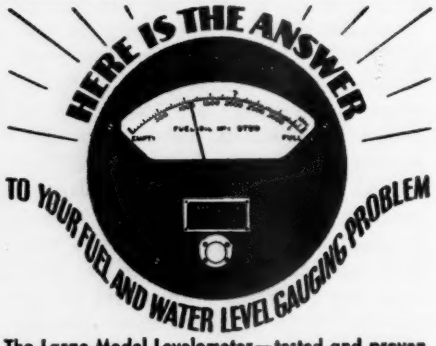

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For further information address American Engineer, reference No. 517.

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For further information address American Engineer, reference No. 518.

STATIC ELECTRICITY

A new technical bulletin relating to the control of static electricity developed on drive and conveyor belts has just been issued by this company. Its purpose is to assist in the prevention of belt-sparking in a wide variety of industries. The information in the bulletin should be of special interest to operators of powder plants, ordnance works, paint and lacquer companies, chemical concerns, flour mills, and other process industries in which dust is a factor.

For further information address American Engineer, reference No. 519.